Offshore Index Assessment Program

2007 Summary Report

Upper Great Lakes Management Unit
Lake Huron
Report: PS-LHA-IA07-SUM

Ministry of
Natural Resources

Ministère des
Richesses naturelles

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Lake Huron
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2007 Summary Report

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Ontario Ministry of Natural Resources
Upper Great Lakes Management Unit
Lake Huron

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Introduction

The Lake Huron office of the Upper Great Lakes Management Unit conducts annual index gill net surveys throughout the Canadian waters of Lake Huron. These waters include the main basin, Georgian Bay, and the North Channel. The surveys are collectively known as the Offshore Index Assessment Program. Its purpose is to monitor the populations of commercially exploited fish species and to collect information about the offshore fish community. The primary objective of the offshore index program is to characterize the strength of year classes of commercially exploited fish species before they are susceptible to commercial fishing gear. The offshore index program is also an important tool for measuring the progress of lake trout (*Salvelinus namaycush*) rehabilitation.

The offshore index program consists of overnight sets of standardized, monofilament gill nets set on the bottom at various locations throughout Lake Huron (Figure 1). The offshore index program has remained essentially unchanged since its inception with only minor modifications to the sampling protocol due to logistical and financial constraints. As a result the offshore index program provides an invaluable, long-term, trend-through-time record of the offshore fish community in Lake Huron.

This report summarizes individual offshore index projects conducted during 2007. Each project is a set of net sets which took place in a specific area during a specific block of time. Any changes to the sampling process that deviated from the long-term protocol are described. Catch per unit of effort (CPUE), length-at-age, and pre-recruit indices are calculated for select species. Differences between the results of this and past field seasons are briefly discussed.

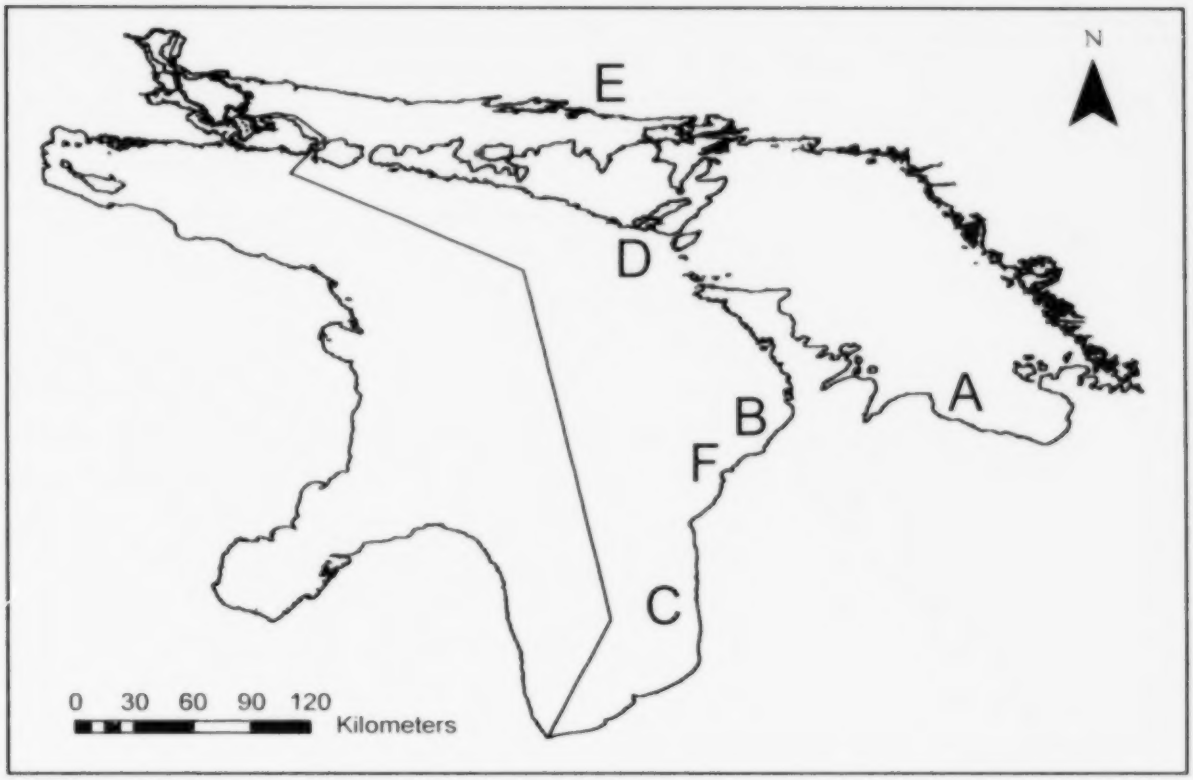


Figure 1. General locations of the offshore index assessment projects conducted in Lake Huron during 2007. The projects were conducted near Cape Rich (A), Southampton (B), Grand Bend (C), Providence Bay (D), Clapperton Island (E), and Douglas Point (F).

Materials and Methods

The offshore index program uses only graded-mesh monofilament gillnets. All of the nets consisted of a 15 m panel of 32 mm (1.25" stretch measure) mesh, a 25 m panel of 38 mm (1.5") mesh, and 50 m panels of 51 mm (2.0"), 64 mm (2.5"), 76 mm (3.0"), 89 mm (3.5"), 102 mm (4.0"), 114 mm (4.5"), and 127 mm (5.0") mesh. This gear is identified as GL32. The collection of individual panels that make up the net are referred to here as a net "gang". During most projects, nets were set perpendicular to the depth contours to maximize catch and reduce the variability between catches. However, all nets were set parallel to the depth contours during the North Channel project due to rapid changes in depth characteristic of that area. The offshore index program was conducted exclusively from the Ontario Ministry of Natural Resources' research vessel the *Atigamayg*.

Detailed information was collected about each net set location. Latitude, longitude, Secchi depth, weather conditions, and surface water temperature were recorded. The water depth and water temperature at depth at each mesh was also noted. Set duration was between 20 and 24 hours unless unsafe conditions were created by inclement weather. Instances where weather prevented net retrieval for an extended period of time were accounted for in calculations of relative abundance by using effective net nights to compensate for gear saturation. If a net fished for more than one night, the number of nights fished was adjusted by a factor of 0.7. Thus a net that fished for two consecutive nights was considered to have fished for 1.4 effective net nights for the purposes of CPUE calculations.

Biological information was collected from the catch. As each net was lifted catch was segregated by mesh size into containers to ease the collection of biological information by mesh size. Fork length, total length, and round weight were measured for up to 20 individuals of each species from each mesh size. In instances where more than 20 individuals of a single species were captured in one mesh size, a sub-sample of 20 was randomly selected for these biological measurements. Fork length and aging structures (if required) were collected from the next 30 individuals. All remaining individuals were counted. Sea lamprey (*Petromyzon marinus*) marks were recorded using Great Lakes Fishery Commission standards (Ebener et al. 2006). Salmonids and lake whitefish (*Coregonus clupeaformis*) were examined for clipped fins. Depending on the objectives of the individual project, any combination of aging structures (scales, otoliths, or fin rays), stomachs, or tissue samples may have been collected.

The structure used to age each fish varied by species. Age was determined from scale samples for most species. Lake herring (*Coregonus artedi*) were aged using otoliths. Lake trout were assigned

an age based on their clipped fins or a coded wire tag number. Lake trout without a coded wire tag or an unambiguous, year-specific fin clip were assigned an age using scale samples.

If sufficient biological information was collected, more information about a species' population was calculated. If enough age and length data were available from a particular species and project, a Von Bertalanffy growth curve was estimated. If enough maturity data was also collected age-at-maturity was estimated using logistic regression. Growth and maturity curves were generated separately for males and females.

Average CPUE is listed for each species in each summary table. In most instances, CPUE was the average number of fish of a given species caught in those nets where at least one individual of that species was caught. This is appropriate for non-target species because a number of nets were set that would not be expected to catch those species. For example, nets targeting deepwater chub (*Coregonus hoyi*) would not be expected to catch species found in shallower water, such as smallmouth bass (*Micropterus dolomieu*). Consequently the chub-targeting nets should not be included in the calculation of average CPUE for smallmouth bass. However, for target species the average CPUE includes the catch from only net sets targeting that species, even if that species was not caught. The offshore index program targets lake trout, lake whitefish, (deepwater) chub, and yellow perch (*Perca flavescens*).

Pre-recruit indices (Hughes 1989) were calculated for commercially exploited species caught in each project. A pre-recruit index uses age-specific CPUE data to infer the relative abundance of cohorts before they are susceptible to commercial fishing gear ("pre-recruits"). The age-specific CPUE values are standardized to a value of ten to allow comparisons between year classes. Values greater than ten indicate that a year class is stronger (greater than average abundance) than average while a value less than ten indicates that a year class is lower than average (Mohr et al. 1997). The index values listed in this report are an average of up to four age-specific, standardized CPUE values from each year class, depending on species and project.

Results

Projects were conducted in both traditional and new locations. Southern Georgian Bay, central Lake Huron, southern Lake Huron, and the North Channel were the traditional locations that were sampled this year. Two projects were conducted in central and southern Lake Huron, one in the spring (May/June) and another in the fall (September/October). Northern Lake Huron was selected as a new location in which to run a project this year to increase the spatial coverage of the offshore index program. A partnership was formed between the Upper Great Lakes Management Unit and

Bruce Power to run a project at a new location in central Lake Huron near the Bruce Nuclear Power Development. The location of all projects are shown in Figure 1.

The 159 nets (62.010 km of gear) set this year captured a total of 24 fish species and 6 020 individuals. Of these 3 819 were biologically sampled. The most common species were yellow perch (48 % of catch), lake whitefish (13 %), and longnose sucker (*Catastomus catastomus*, 8 %). Of the 353 lake trout that were sampled, 80 (22.7 %) were unclipped and presumed to be naturally produced. This proportion is the highest ever observed in the offshore index program and roughly twice the proportion from last year. This value continues the increasing trend in the number of unclipped lake trout observed during the offshore index program since the mid 1990s.

Southern Georgian Bay **[LHA_IA07_002]**

This project was conducted in southern Georgian Bay near Cape Rich between August 07 and August 23 (Table 1). All 21 net sets were approximately 24 hours in duration. Lake trout and lake whitefish were targeted. The nets were heavily slimed when they were set between 30 m and 40 m. A higher proportion of nets were slimed last year; 56.7 % compared to 28.6 % this year. The quantity of slime likely reduced the ability of the nets to catch fish, one of the slimed nets caught no fish. The position of each net is shown in Figure 2.

Eleven fish species were caught during this project (Table 2). Seven more species were caught last year. This decrease in species diversity may be due to decreased effort; nine more nets were set last year. The most common species caught during this year's program were white sucker (*Catostomus commersoni*, 27.5 % of catch), burbot (*Lota lota*, 18.7 %), and lake whitefish (14.1 %). Plots of the biological attributes of the lake whitefish (Figures 3) and round whitefish (*Prosopium cylindraceum*) (Figures 4) captured during this project were constructed.

Average CPUE for this project was 13.5 fish/night. Catches were highest in the 32 mm and 76 mm meshes. The former caught mostly lake chub (*Couesius plumbeus*) while the latter caught mostly white sucker. White sucker had the highest average CPUE (26.0), followed by lake chub (18.5), and round whitefish (6.5).

Table 1. Set information for the fishing gear deployed in southern Georgian Bay during the 2007 offshore index program.

Sample Number	Set Date	Latitude	Longitude	Gear Code	Effort Duration (hrs)	Average Depth (m)
201	07-Aug-07	44° 42.29'	-80° 37.51'	GL32	23.58	18.6
202	07-Aug-07	44° 41.88'	-80° 37.18'	GL32	23.76	18.2
203	07-Aug-07	44° 40.51'	-80° 37.23'	GL32	24.05	17.6
204	08-Aug-07	44° 40.42'	-80° 34.82'	GL32	22.11	56.1
205	08-Aug-07	44° 40.35'	-80° 33.89'	GL32	21.35	74.8
206	08-Aug-07	44° 41.51'	-80° 31.47'	GL32	20.25	67.3
207	09-Aug-07	44° 37.90'	-80° 35.61'	GL32	23.61	40.6
208	09-Aug-07	44° 38.28'	-80° 36.03'	GL32	23.53	39.6
209	09-Aug-07	44° 39.84'	-80° 36.68'	GL32	23.41	37.5
210	13-Aug-07	44° 39.01'	-80° 30.70'	GL32	24.06	64.2
211	13-Aug-07	44° 39.22'	-80° 31.74'	GL32	24.31	61.0
212	13-Aug-07	44° 39.22'	-80° 31.74'	GL32	24.53	61.0
213	14-Aug-07	44° 44.33'	-80° 34.02'	GL32	21.68	33.6
214	14-Aug-07	44° 45.55'	-80° 34.71'	GL32	21.90	31.1
215	14-Aug-07	44° 44.53'	-80° 33.31'	GL32	21.50	29.9
216	15-Aug-07	44° 39.27'	-80° 33.94'	GL32	23.56	69.5
217	15-Aug-07	44° 39.29'	-80° 33.12'	GL32	22.73	73.8
218	15-Aug-07	44° 39.75'	-80° 31.25'	GL32	21.78	88.9
219	22-Aug-07	44° 37.44'	-80° 34.37'	GL32	22.18	31.8
220	22-Aug-07	44° 37.04'	-80° 33.52'	GL32	22.11	31.5
221	22-Aug-07	44° 37.24'	-80° 30.66'	GL32	21.95	34.4

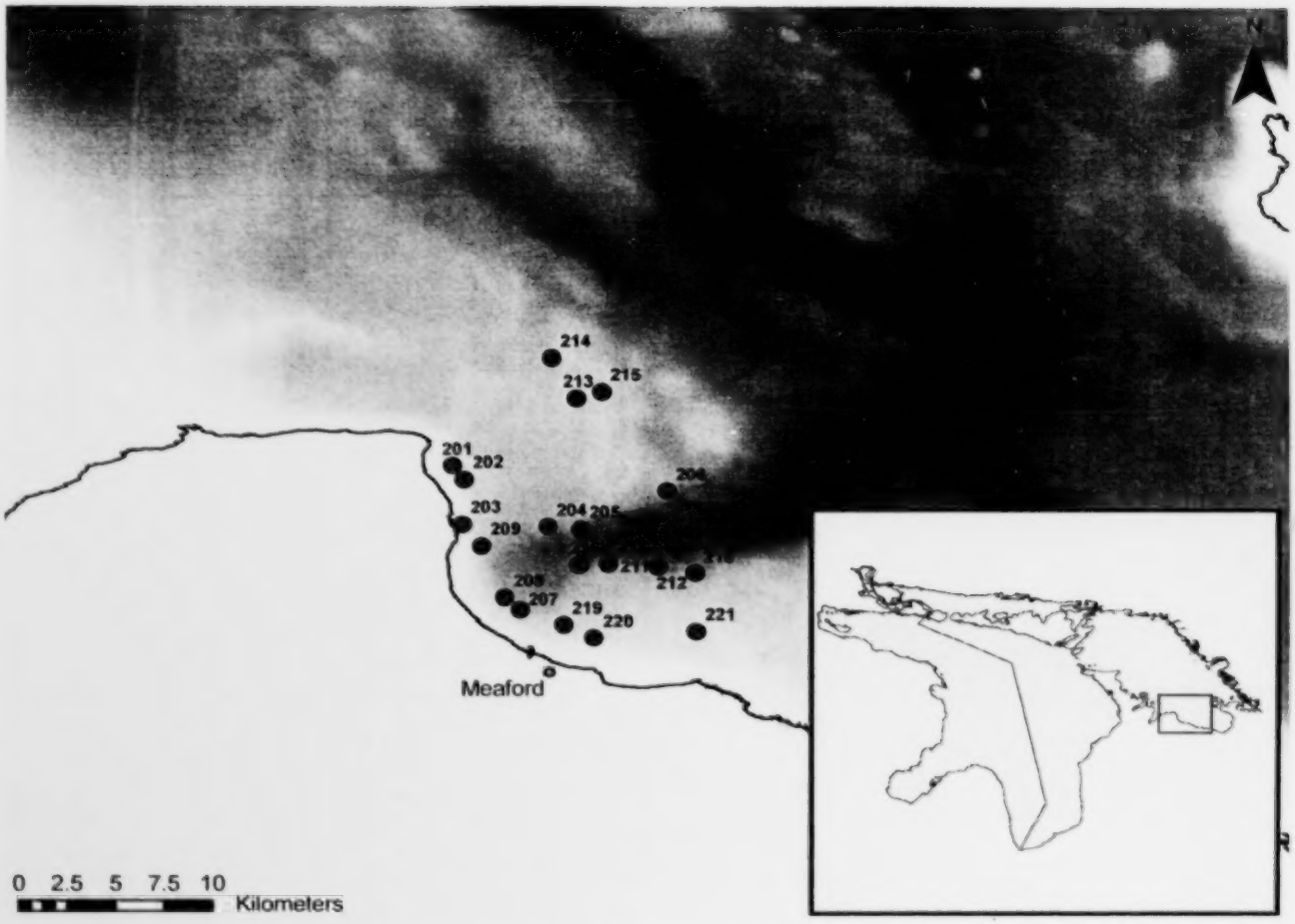
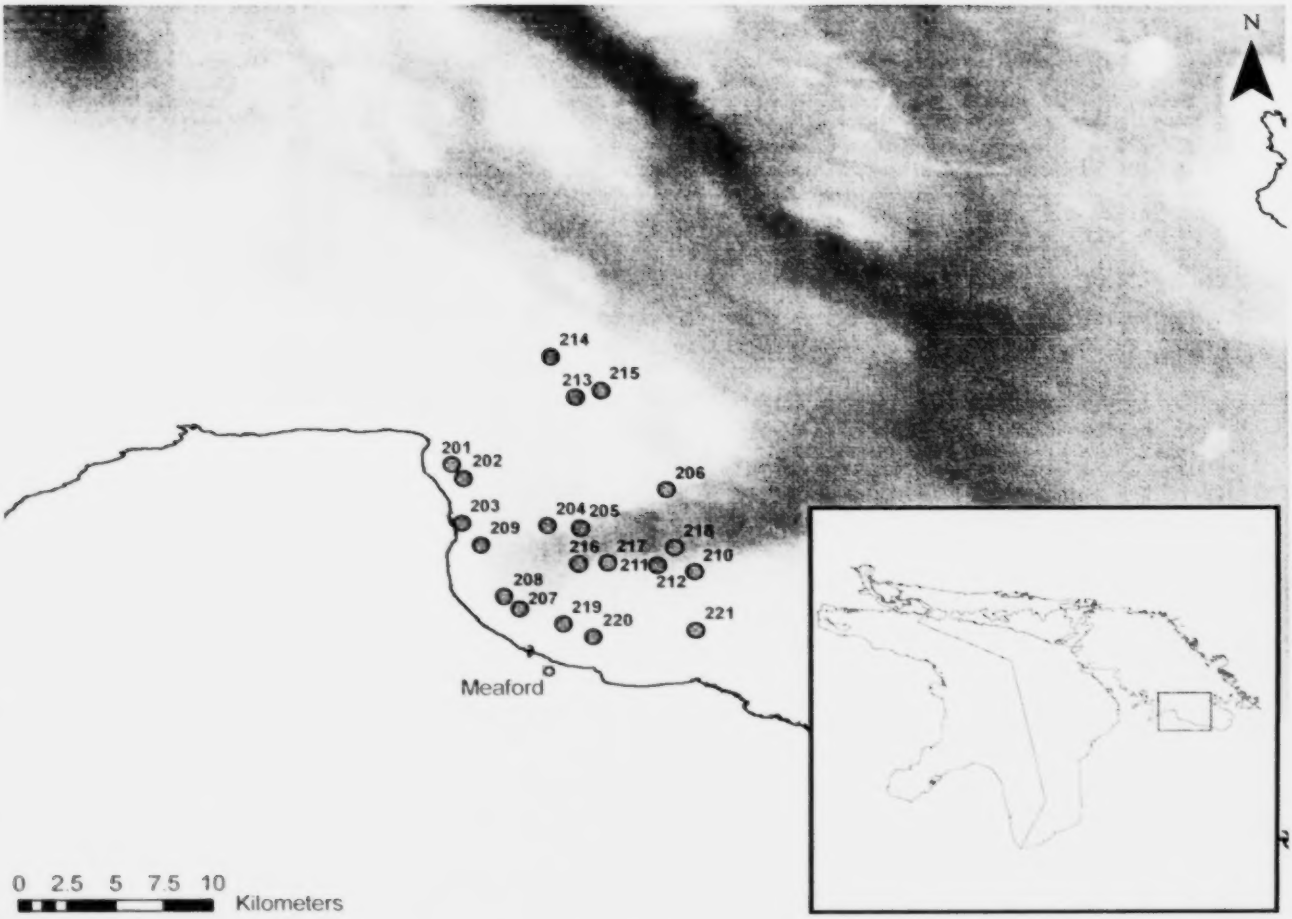


Figure 2. Offshore index sampling locations in southern Georgian Bay near Cape Rich during 2007 (project code LHA_IA07_002). Lake whitefish and lake trout were targeted.

Table 2. Count of the number of fish by species caught in each mesh size of the gill nets set in southern Georgian Bay during the 2007 offshore index program. Catch per unit effort (CPUE) is the mean number of fish caught per net each night.

	Mesh Size (mm)										
Species	**032**	**038**	**051**	**064**	**076**	**089**	**102**	**114**	**127**	**Total**	**CPUE**
Burbot		5	14	20	11	3				53	3.12
Chinook Salmon	1	2	1			1				5	1.67
Chub	9	5	1							15	0.00
Lake Chub	34	3								37	18.50
Lake Trout				3	2	4	1		1	11	0.52
Lake Whitefish			1	5	5	13	8	8		40	1.90
Longnose Sucker		1		2	3	3	1	1		11	2.75
Rainbow Trout		1	1							2	2.00
Round Goby	3	1	2							6	3.00
Round Whitefish			9	5	6	1	5			26	6.50
White Sucker		1	5	6	20	9	15	12	10	78	26.00
Total	47	19	34	41	47	34	30	21	11	284	



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Chinook Salmon	1	2	1			1				5	1.67
Chub	9	5	1							15	0.00
Lake Chub	34	3								37	18.50
Lake Trout				3	2	4	1		1	11	0.52
Lake Whitefish			1	5	5	13	8	8		40	1.90
Longnose Sucker		1		2	3	3	1	1		11	2.75
Rainbow Trout		1	1							2	2.00
Round Goby	3	1	2							6	3.00
Round Whitefish			9	5	6	1	5			26	6.50
White Sucker		1	5	6	20	9	15	12	10	78	26.00
Total	47	19	34	41	47	34	30	21	11	284	

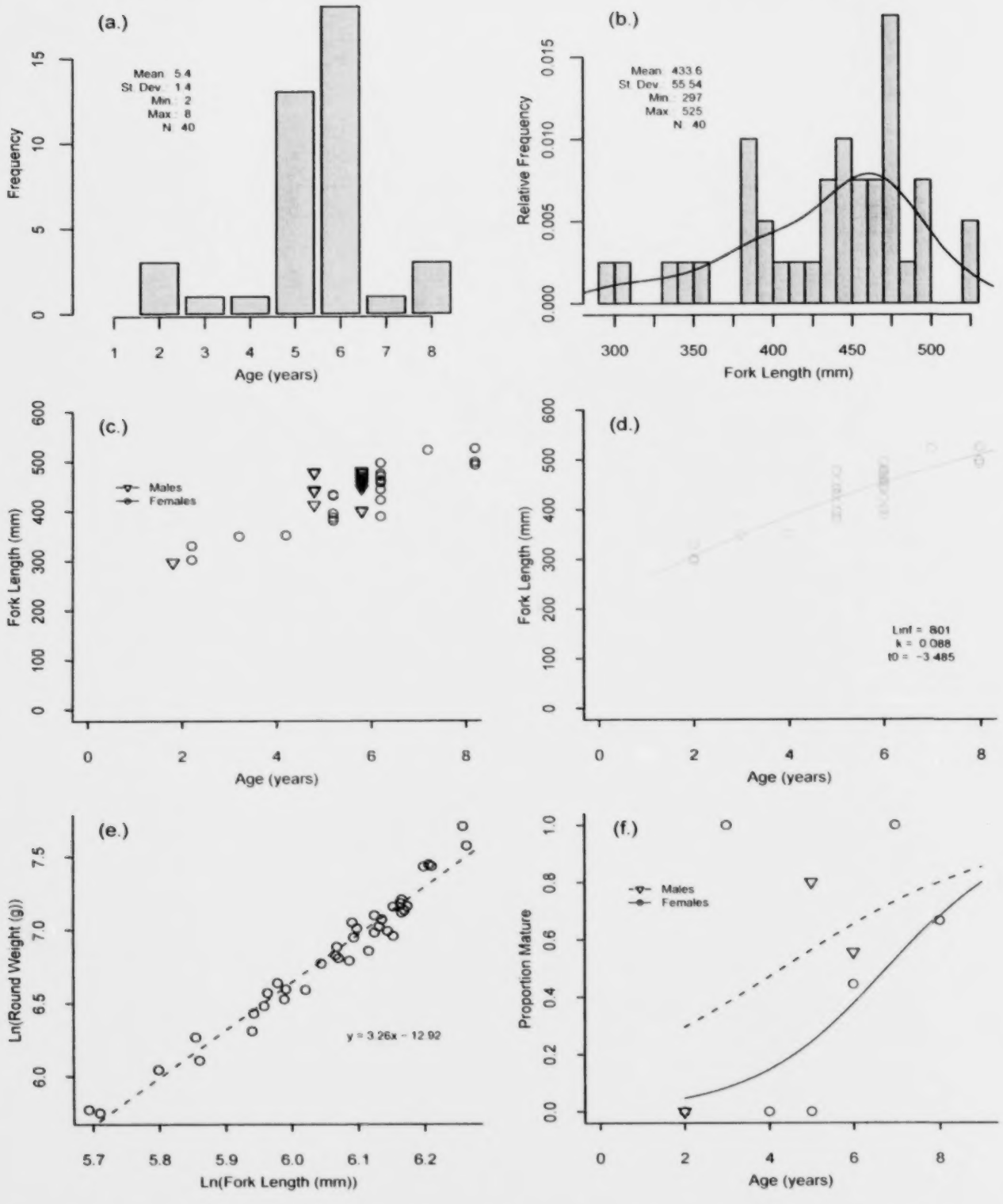


Figure 3. Lake whitefish fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the 2007 Cape Rich project (LHA_IA07_002).

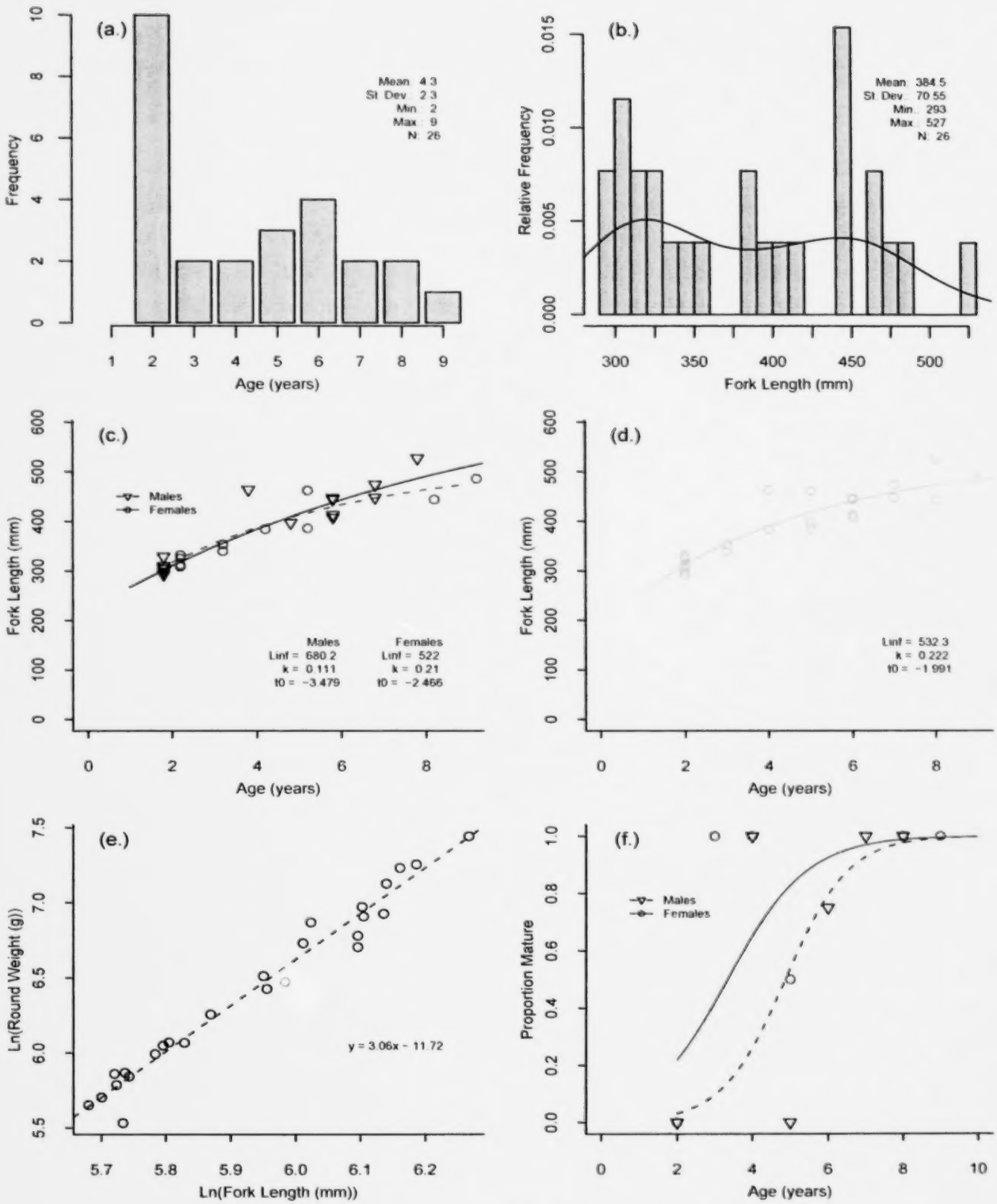


Figure 4. Round whitefish fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the 2007 Cape Rich project (LHA_IA07_002).

Central Lake Huron (Spring) **[LHA_IA07_005]**

This project was conducted in central Lake Huron near Southampton between May 29 and June 13 (Table 3). The depth of the nets ranged between 9.0 m and 50.5 m. Three of the 21 nets fished for more than one night due to inclement weather creating unsafe work conditions. Lake whitefish, chub, and yellow perch were sought. The position of each net is shown in Figure 5.

Fifteen fish species were caught during this project (Table 4). Last year six more nets were set, producing a total of fourteen species. Deepwater chub were much less abundant this year (3) than last year (185). However, 40.7 % of nets were set below 50 m last year, compared to only 4.8 % this year. The most common species were lake whitefish (35.4 % of catch), lake trout (33.9 %), and round whitefish (8.7 %). Plots of the biological attributes of the lake trout (Figure 6), lake whitefish (Figure 7), lake herring (Figure 8), and round whitefish (Figure 9) captured during this project were constructed.

Average CPUE for this project was 11.4 fish/night. Round whitefish had the highest average CPUE (4.4), followed by lake trout (4.3), and lake whitefish (3.8). Lake trout were caught the most in mesh sizes greater than 64 mm.

Table 3. Set information for the fishing gear deployed in the spring in the central main basin during the 2007 offshore index program.

Sample Number	Set Date	Latitude	Longitude	Gear Code	Effort Duration (hrs)	Average Depth (m)
501	29-May-07	44° 35.39'	-81° 22.07'	GL32	23.38	27.7
502	29-May-07	44° 36.22'	-81° 22.08'	GL32	23.46	28.5
503	29-May-07	44° 36.38'	-81° 22.91'	GL32	23.54	32.6
504	30-May-07	44° 37.23'	-81° 24.24'	GL32	22.90	37.4
505	30-May-07	44° 36.61'	-81° 24.75'	GL32	22.18	38.8
506	30-May-07	44° 36.63'	-81° 25.89'	GL32	21.36	45.0
507	31-May-07	44° 42.52'	-81° 19.32'	GL32	21.65	14.1
508	31-May-07	44° 41.92'	-81° 19.14'	GL32	21.78	14.3
509	31-May-07	44° 41.01'	-81° 19.19'	GL32	21.91	13.9
510	04-Jun-07	44° 43.50'	-81° 28.39'	GL32	46.98	48.3
511	04-Jun-07	44° 42.89'	-81° 27.71'	GL32	47.43	48.2
512	04-Jun-07	44° 42.88'	-81° 26.69'	GL32	47.68	43.3
513	06-Jun-07	44° 42.82'	-81° 23.08'	GL32	21.25	30.0
514	06-Jun-07	44° 42.19'	-81° 22.77'	GL32	21.41	32.1
515	06-Jun-07	44° 42.20'	-81° 22.04'	GL32	21.95	26.6
516	11-Jun-07	44° 31.71'	-81° 31.06'	GL32	24.88	48.8
517	11-Jun-07	44° 32.12'	-81° 30.46'	GL32	24.20	49.5
518	11-Jun-07	44° 32.93'	-81° 30.28'	GL32	23.50	50.5
519	12-Jun-07	44° 30.05'	-81° 25.70'	GL32	22.00	21.8
520	12-Jun-07	44° 30.43'	-81° 24.54'	GL32	21.25	15.4
521	12-Jun-07	44° 31.84'	-81° 23.04'	GL32	20.40	9.0

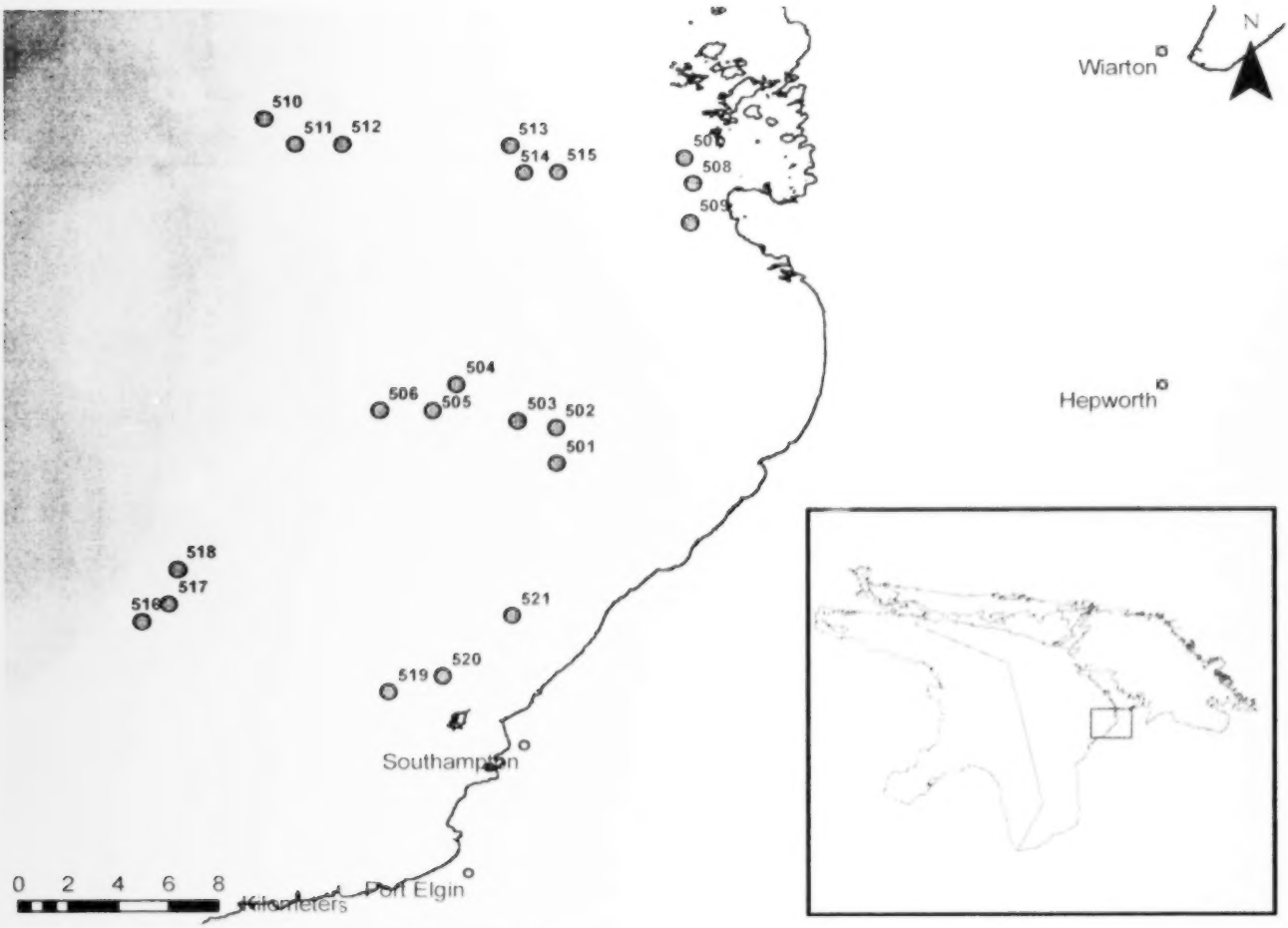
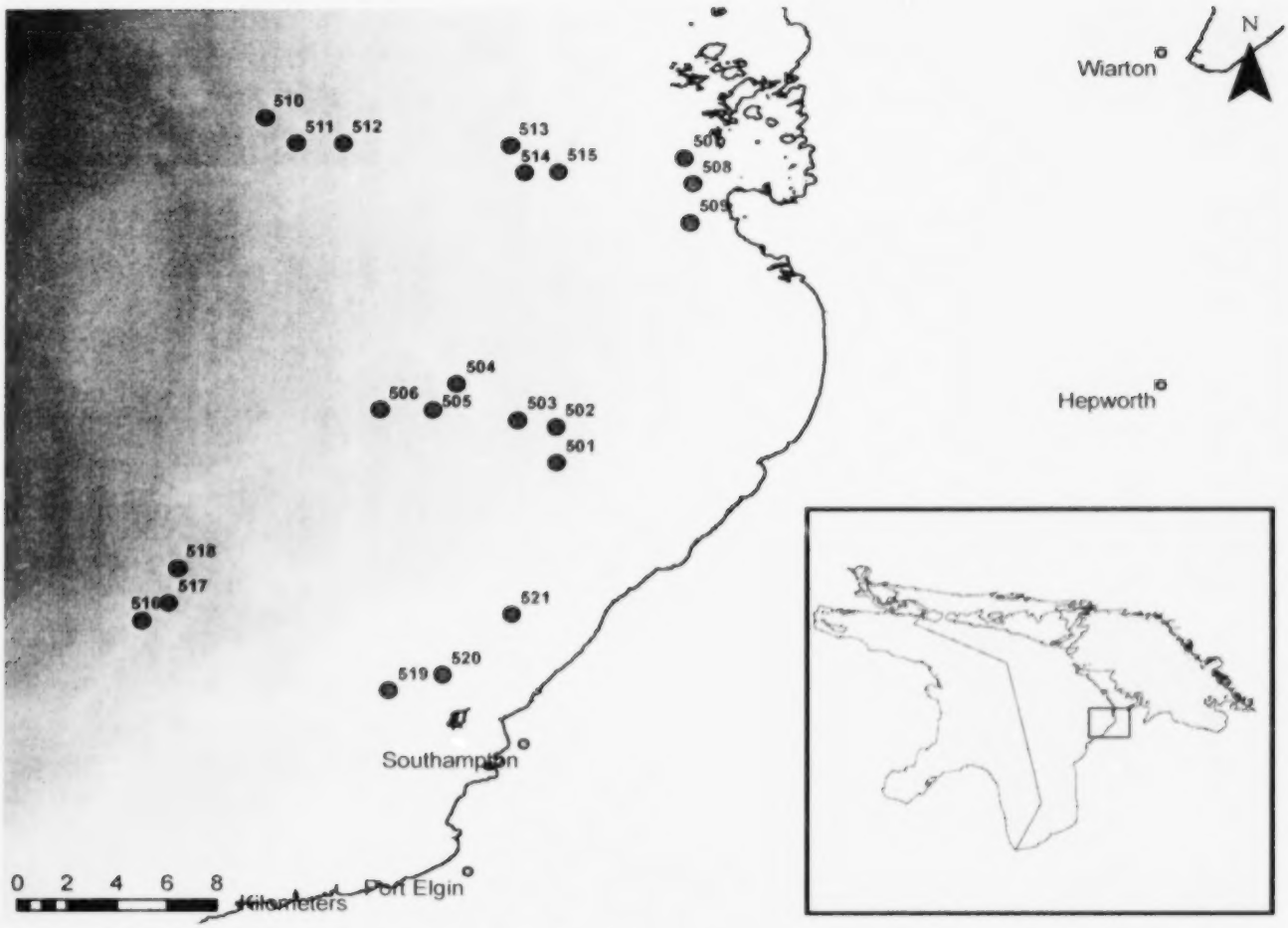


Figure 5. Offshore index sampling locations in the central main basin near Southampton during 2007 (project code LHA_IA07_005) during the spring (May and June). Deepwater chub, lake whitefish, and yellow perch were targeted.

Table 4. Count of the number of fish by species caught in each mesh size of the gill nets set in the central main basin in the spring during the 2007 offshore index program. Catch per unit effort (CPUE) is the mean number of fish caught per net each night.

	Mesh Size (mm)										
Species	**032**	**038**	**051**	**064**	**076**	**089**	**102**	**114**	**127**	**Total**	**CPUE**
Alewife	1	2								3	1.00
Burbot				5	2	1	1			9	2.05
Chub				3						3	0.00
Lake Chub	1									1	1.00
Lake Herring	1	1	3	10	4	1				20	2.17
Lake Trout	1		1	9	14	14	13	18	16	86	4.26
Lake Whitefish		2	4	4	7	16	23	28	6	90	3.83
Longnose Sucker			1	1		3	2			7	1.17
Rainbow Smelt		1								1	1.00
Rock Bass			1							1	1.00
Round Goby	1	5								6	1.11
Round Whitefish		1	11	1	9					22	4.40
Walleye								1		1	1.00
White Sucker					1		1	1		3	1.50
Yellow Perch			1							1	0.17
Total	5	12	22	33	37	35	40	48	22	254	



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Lake Chub	1									1	1.00
Lake Herring	1	1	3	10	4	1				20	2.17
Lake Trout	1		1	9	14	14	13	18	16	86	4.26
Lake Whitefish		2	4	4	7	16	23	28	6	90	3.83
Longnose Sucker			1	1		3	2			7	1.17
Rainbow Smelt		1								1	1.00
Rock Bass			1							1	1.00
Round Goby	1	5								6	1.11
Round Whitefish		1	11	1	9					22	4.40
Walleye								1		1	1.00
White Sucker					1		1	1		3	1.50
Yellow Perch			1							1	0.17
Total	5	12	22	33	37	35	40	48	22	254	

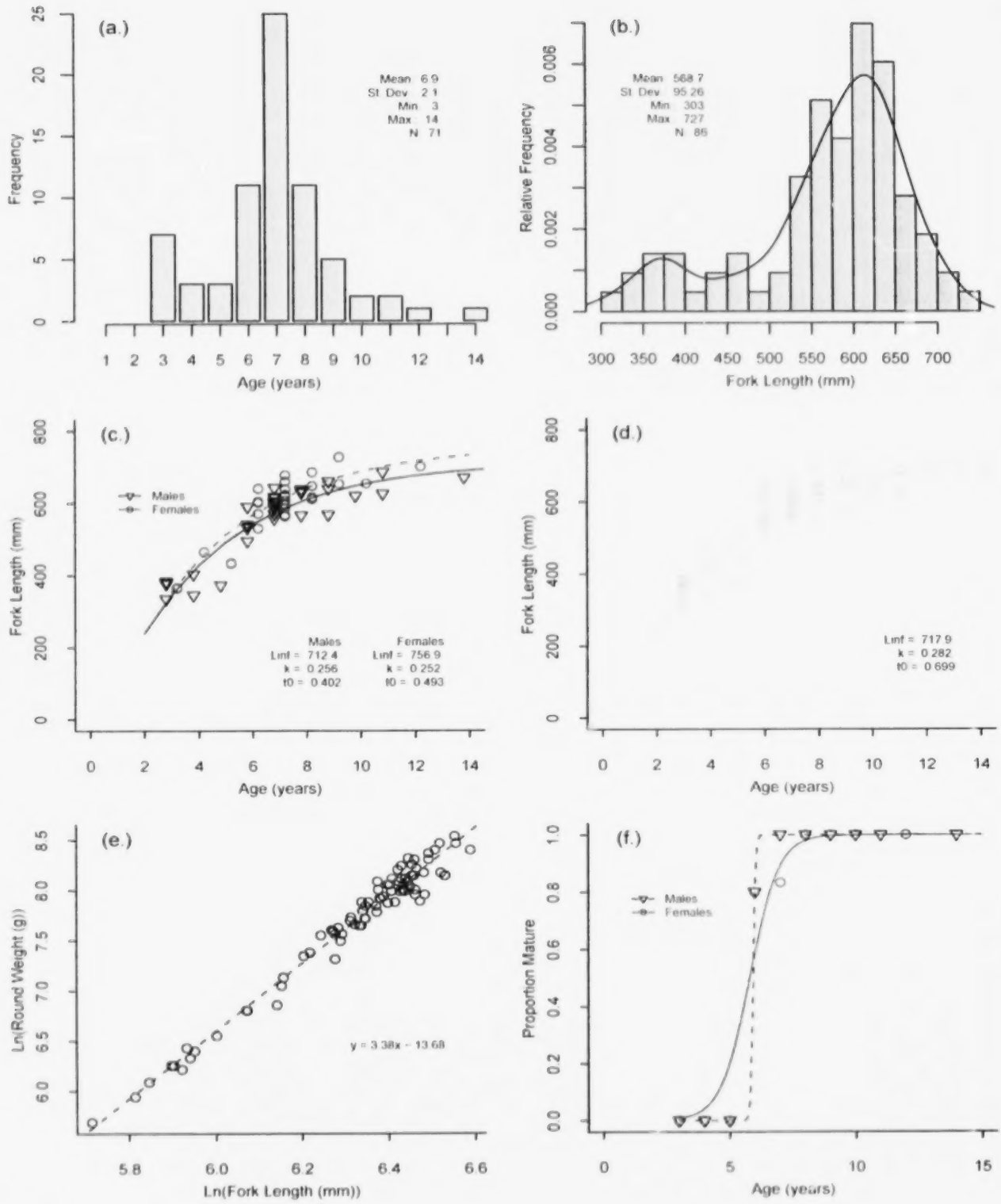

Figure 6. Lake trout fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the Southampton project (LHA_IA07_005), June 2007.

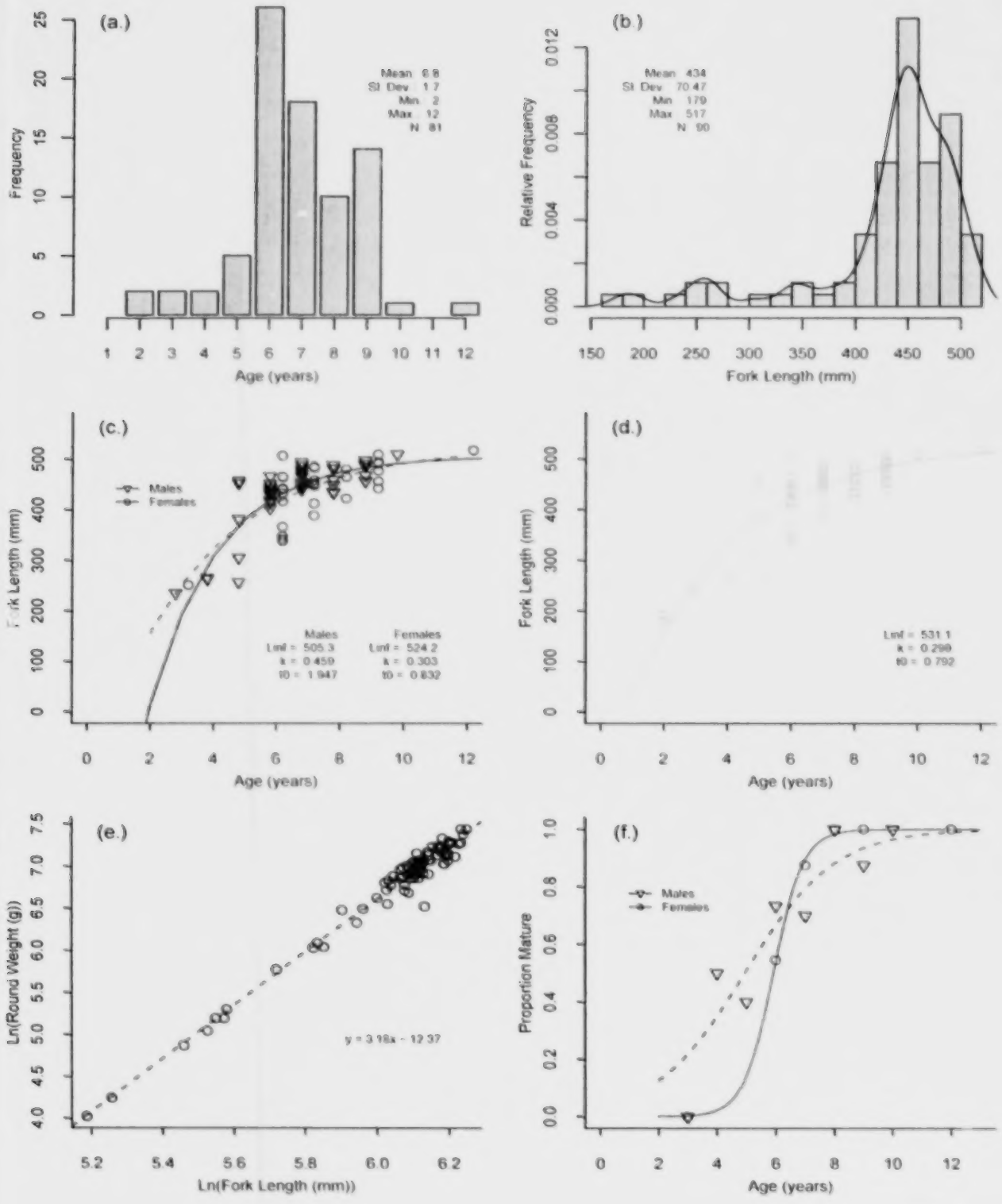

Figure 7. Lake whitefish fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the Southampton project (LHA_IA07_005), June 2007.

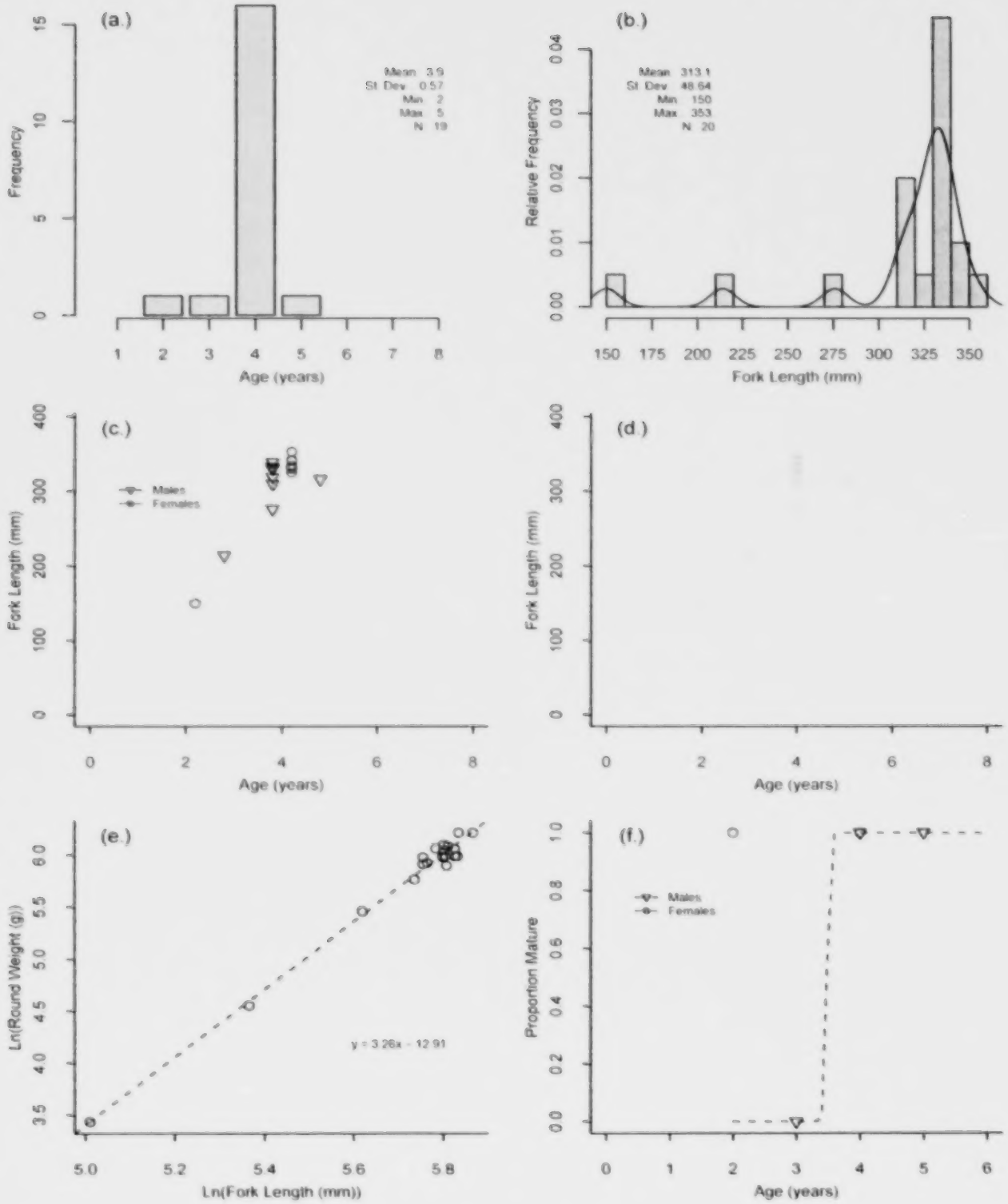

Figure 8. Lake herring fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the Southampton project (LHA_IA07_005), June 2007.

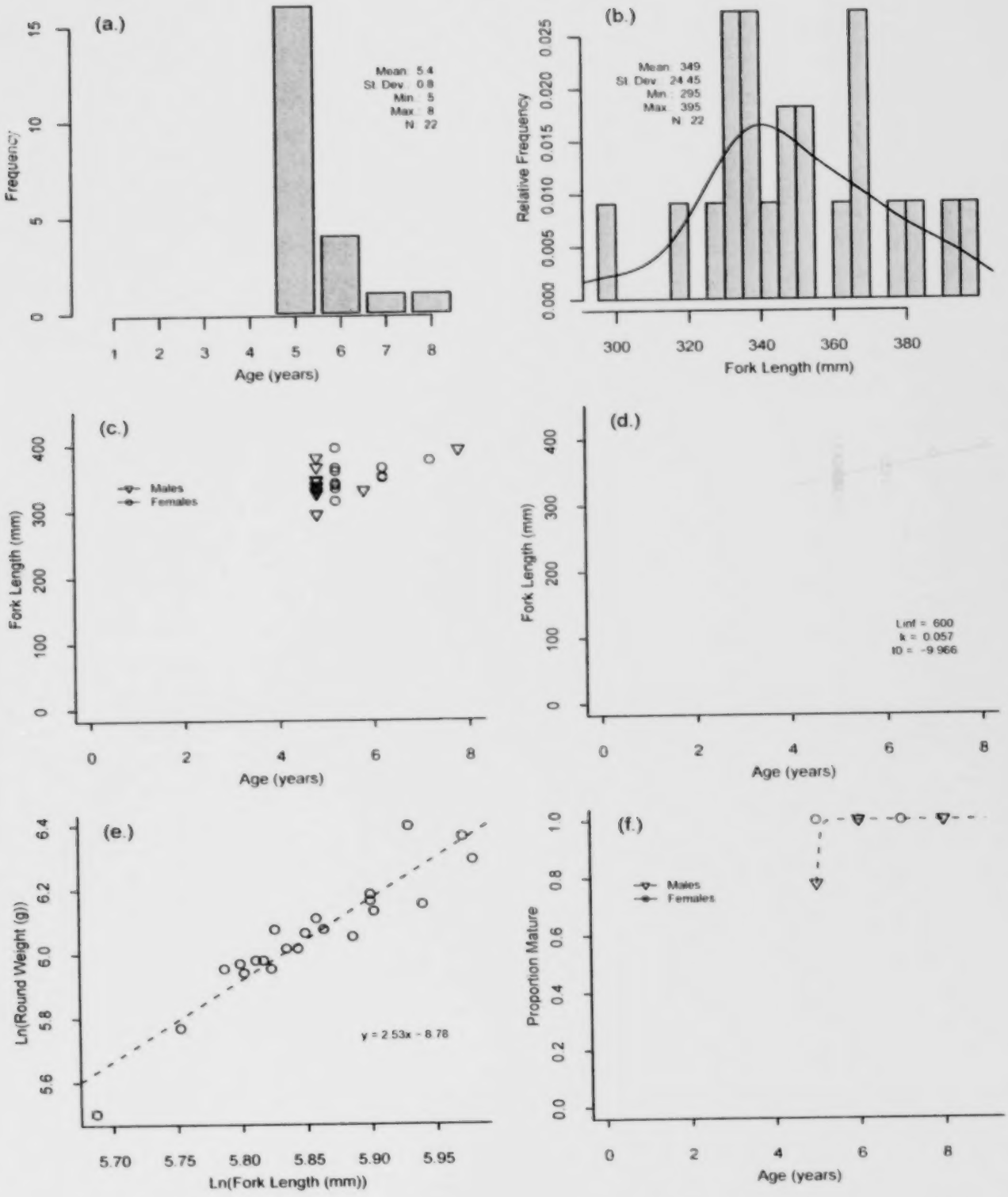

Figure 9. Round whitefish fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the Southampton project (LHA_IA07_005), June 2007.

Central Lake Huron (Fall) **[LHA_IA07_005]**

This project was conducted in central Lake Huron near Southampton between September 17 and October 18 (Table 5). The depth of the nets ranged between 13.3 m and 57.5 m. Three of the 21 nets fished for more than one night due to inclement weather creating unsafe work conditions. Lake whitefish, chub, and yellow perch were sought. The position of each net is shown in Figure 10. Effort was applied at irregular intervals due to logistic constraints. Nets were set during mid-September, late-September, and late-October. Last year the same number of nets were set at regular intervals during September.

Twenty fish species were caught during this project (Table 6), more than twice the number caught last year and above the long-term average. The most common species were longnose sucker (42.1 % of catch), lake whitefish (14.3 %), and yellow perch (9.7 %). Although deepwater chub were caught, they were absent from nets targeting them specifically. Plots of the biological attributes of the lake trout (Figure 11), lake whitefish (Figure 12), lake herring (Figure 13), and yellow perch (Figure 14) captured during this project were constructed.

Average CPUE for this project was 33.3 fish/night. Longnose sucker had the highest mean CPUE (23.6), followed by yellow perch (10.3), and lake whitefish (5.5). High catches of lake whitefish were restricted to mesh sizes larger than 89 mm.

Table 5. Set information for the fishing gear deployed in the fall in the central main basin during the 2007 offshore index program.

Sample Number	Set Date	Latitude	Longitude	Gear Code	Effort Duration (hrs)	Average Depth (m)
551	17-Sep-07	44° 37.41'	-81° 22.06'	GL32	25.26	28.9
552	17-Sep-07	44° 36.79'	-81° 21.98'	GL32	24.16	29.7
553	17-Sep-07	44° 36.99'	-81° 24.09'	GL32	23.35	29.1
554	18-Sep-07	44° 38.80'	-81° 25.38'	GL32	20.76	40.5
555	18-Sep-07	44° 39.51'	-81° 25.93'	GL32	20.90	41.6
556	18-Sep-07	44° 40.58'	-81° 24.49'	GL32	21.33	35.1
557	19-Sep-07	44° 42.75'	-81° 22.81'	GL32	23.63	29.5
558	19-Sep-07	44° 42.04'	-81° 21.23'	GL32	22.95	31.9
559	19-Sep-07	44° 42.17'	-81° 21.56'	GL32	22.30	24.8
560	20-Sep-07	44° 41.09'	-81° 28.62'	GL32	21.85	56.6
561	20-Sep-07	44° 40.34'	-81° 29.03'	GL32	22.10	57.5
562	20-Sep-07	44° 40.42'	-81° 27.18'	GL32	22.30	47.6
563	27-Sep-07	44° 33.24'	-81° 29.97'	GL32	47.38	49.1
564	27-Sep-07	44° 32.54'	-81° 30.22'	GL32	46.51	49.3
565	27-Sep-07	44° 31.62'	-81° 29.35'	GL32	45.63	40.9
566	16-Oct-07	44° 41.13'	-81° 19.25'	GL32	21.79	13.3
567	16-Oct-07	44° 41.92'	-81° 18.97'	GL32	22.01	13.3
568	16-Oct-07	44° 41.96'	-81° 20.28'	GL32	22.26	18.2
569	17-Oct-07	44° 37.42'	-81° 19.85'	GL32	23.10	19.0
570	17-Oct-07	44° 36.80'	-81° 19.97'	GL32	23.51	18.6
571	17-Oct-07	44° 36.75'	-81° 19.23'	GL32	23.65	14.9

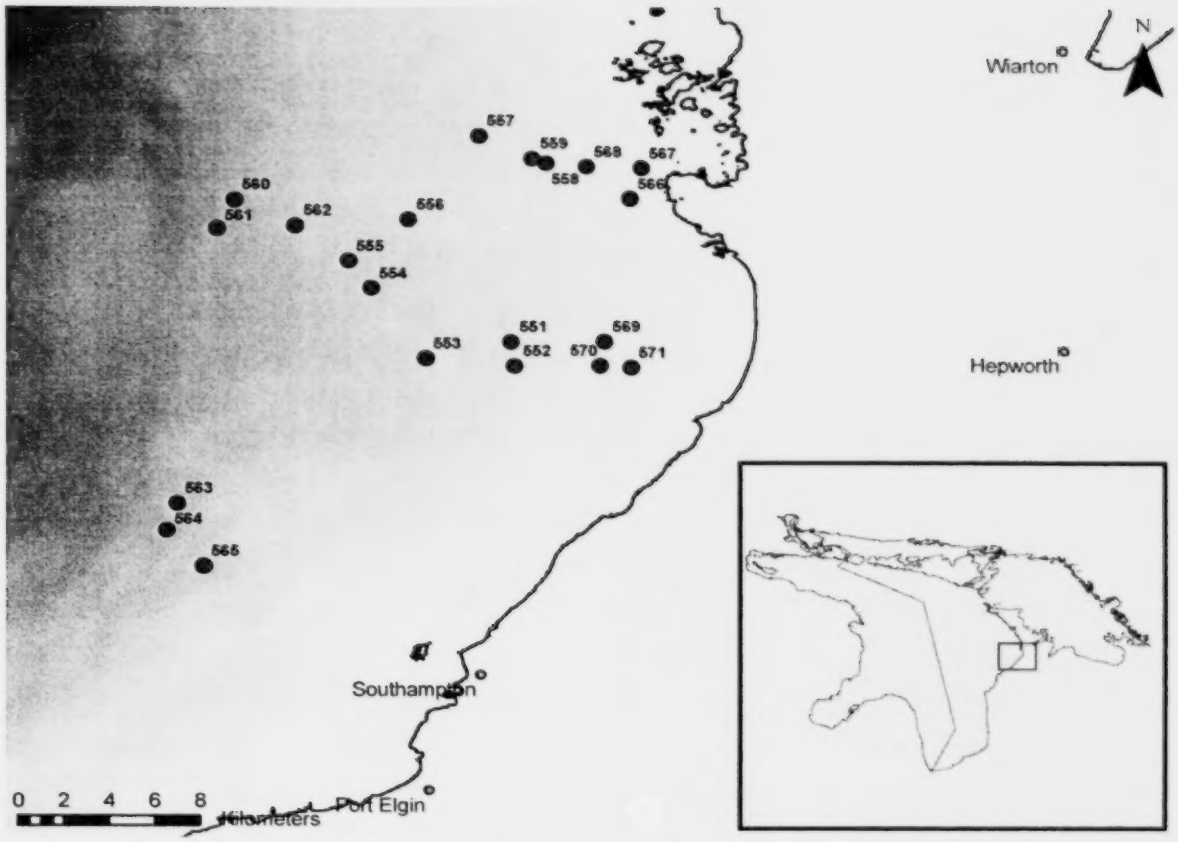

Figure 10. Offshore index sampling locations in the central main basin near Southampton during 2007 (project code LHA_IA07_005) during the fall (Sep./Oct.). Deepwater chub, lake whitefish, and yellow perch were targeted.

Table 6. Count of the number of fish by species caught in each mesh size of the gill nets set in the central main basin in the fall during the 2007 offshore index program. Catch per unit effort (CPUE) is the mean number of fish caught per net each night.

	Mesh Size (mm)									
Species	**032**	**038**	**051**	**064**	**076**	**089**	**102**	**114**	**127**	**Total**	**CPUE**
Alewife		1								1	1.00
Burbot			1	2	8	2				13	2.60
Chinook Salmon		1	7	3	1					12	3.00
Chub	6									6	0.00
Coho Salmon				1						1	1.00
Common Carp						1			1	2	1.00
Lake Chub	11	2								13	3.25
Lake Herring		3	8	7	5	1				24	2.67
Lake Trout			1	9	3	10	9	15	8	55	5.39
Lake Whitefish		1	3	2	7	7	35	32	19	106	5.45
Longnose Sucker	4	4	57	76	68	57	35	9	1	311	23.56
Rainbow Smelt	11	4	14	16	11	1	1	2	3	63	5.25
Rainbow Trout								1		1	1.00
Rock Bass			2							2	2.00
Round Goby	1	7	10							18	2.57
Round Whitefish		1	5	5	4	2				17	2.02
Walleye				1				2	1	4	1.00
White Bass							1			1	1.00
White Sucker			10	4	3					17	3.40
Yellow Perch	45	19	8							72	10.33
Total	78	43	126	126	110	81	81	61	33	739	

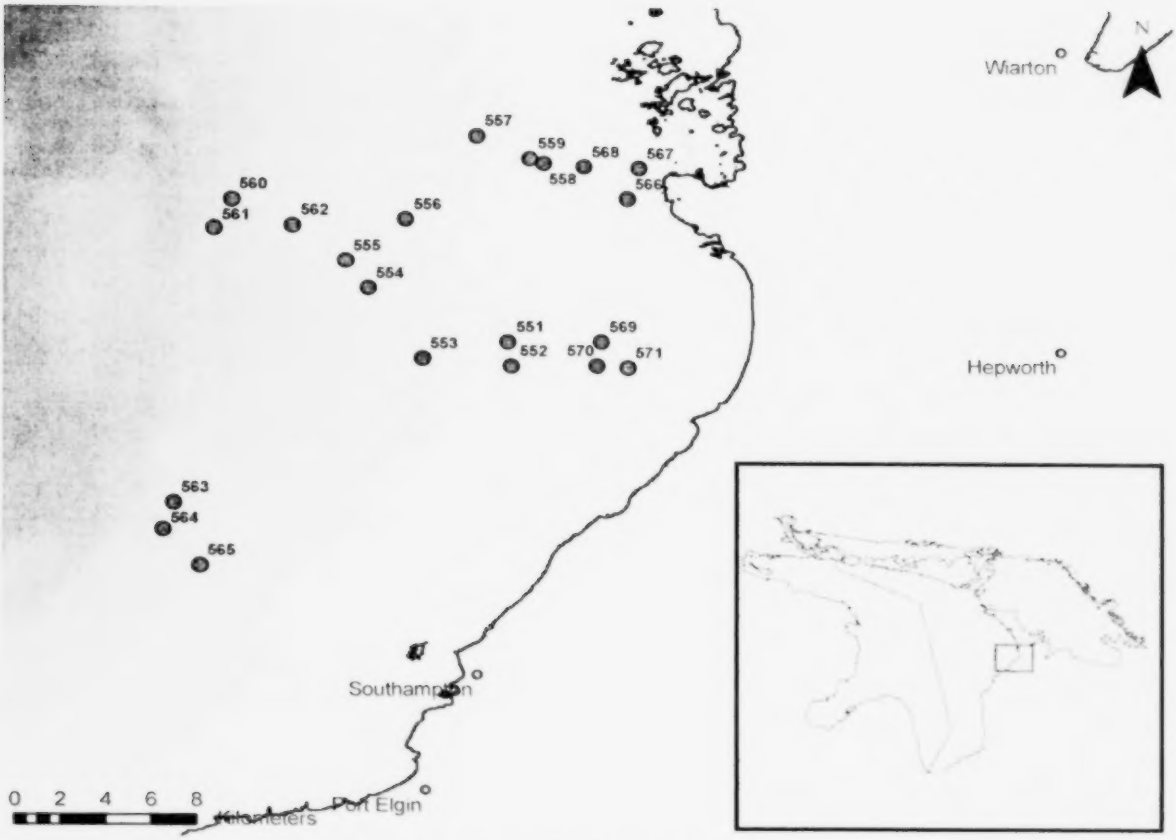

Figure 10. Offshore index sampling locations in the central main basin near Southampton during 2007 (project code LHA_IA07_005) during the fall (Sep /Oct). Deepwater chub, lake whitefish, and yellow perch were targeted.

Table 6. Count of the number of fish by species caught in each mesh size of the gill nets set in the central main basin in the fall during the 2007 offshore index program. Catch per unit effort (CPUE) is the mean number of fish caught per net each night.

	Mesh Size (mm)										
Species	**032**	**038**	**051**	**064**	**076**	**089**	**102**	**114**	**127**	**Total**	**CPUE**
Alewife		1								1	1.00
Burbot			1	2	8	2				13	2.60
Chinook Salmon		1	7	3	1					12	3.00
Chub	6									6	0.00
Coho Salmon				1						1	1.00
Common Carp						1			1	2	1.00
Lake Chub	11	2								13	3.25
Lake Herring		3	8	7	5	1				24	2.67
Lake Trout			1	9	3	10	9	15	8	55	5.39
Lake Whitefish		1	3	2	7	7	35	32	19	106	5.45
Longnose Sucker	4	4	57	76	68	57	35	9	1	311	23.56
Rainbow Smelt	11	4	14	16	11	1	1	2	3	63	5.25
Rainbow Trout								1		1	1.00
Rock Bass			2							2	2.00
Round Goby	1	7	10							18	2.57
Round Whitefish		1	5	5	4	2				17	2.02
Walleye				1				2	1	4	1.00
White Bass							1			1	1.00
White Sucker			10	4	3					17	3.40
Yellow Perch	45	19	8							72	10.33
Total	78	43	126	126	110	81	81	61	33	739	

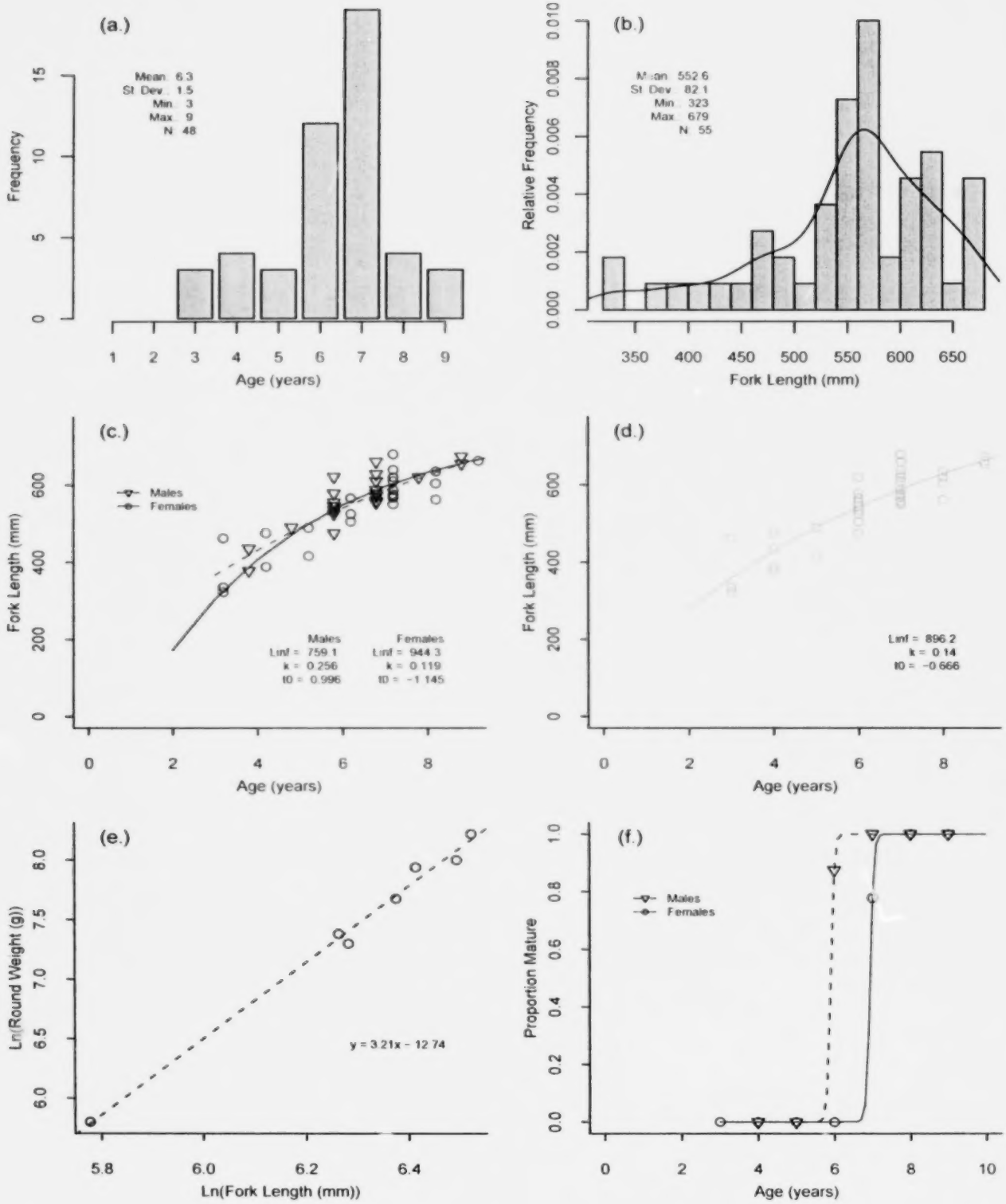

Figure 11. Lake trout fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the Southampton project (LHA_IA07_005), September 2007.

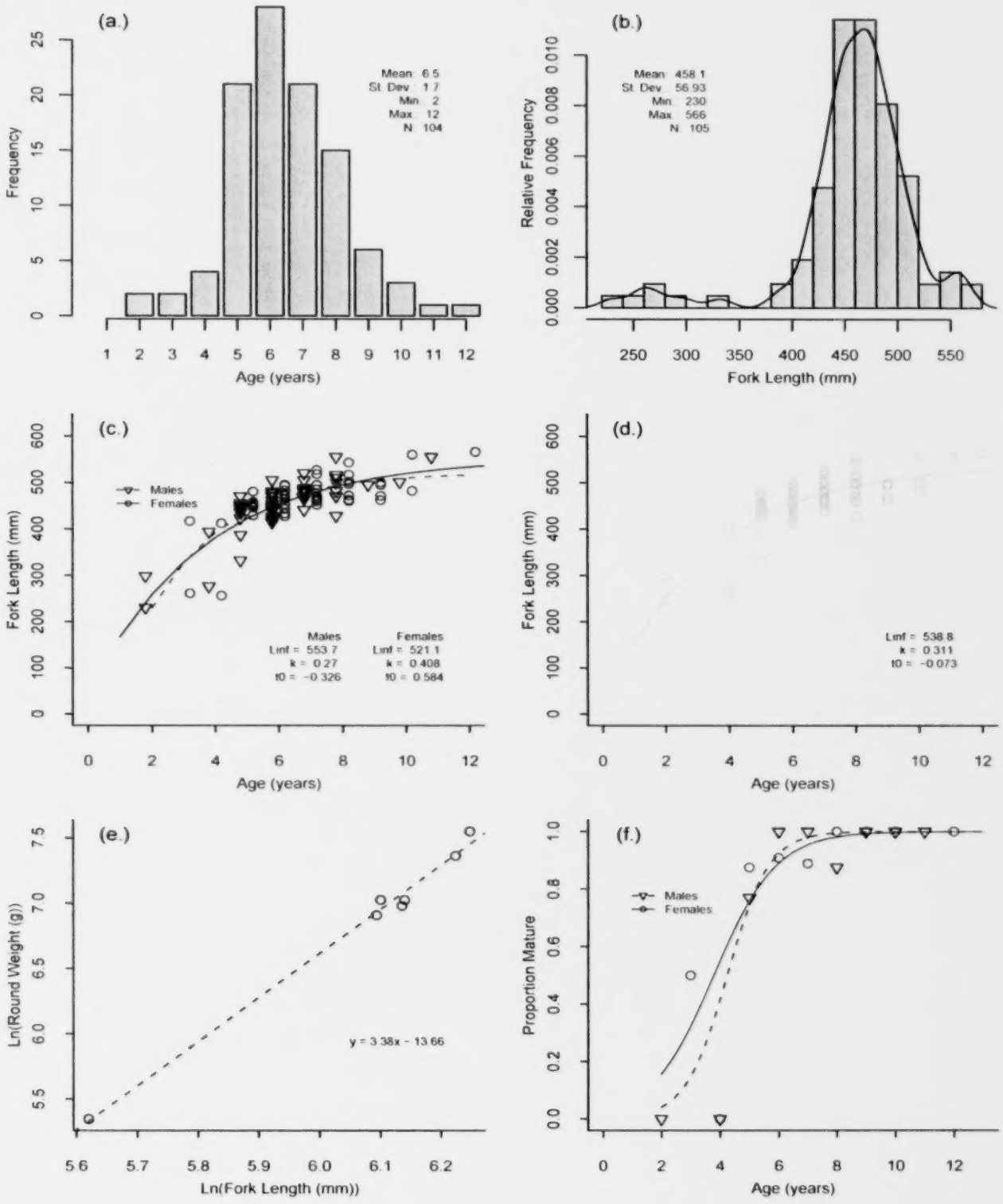

Figure 12. Lake whitefish fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the Southampton project (LHA_IA07_005), September 2007.

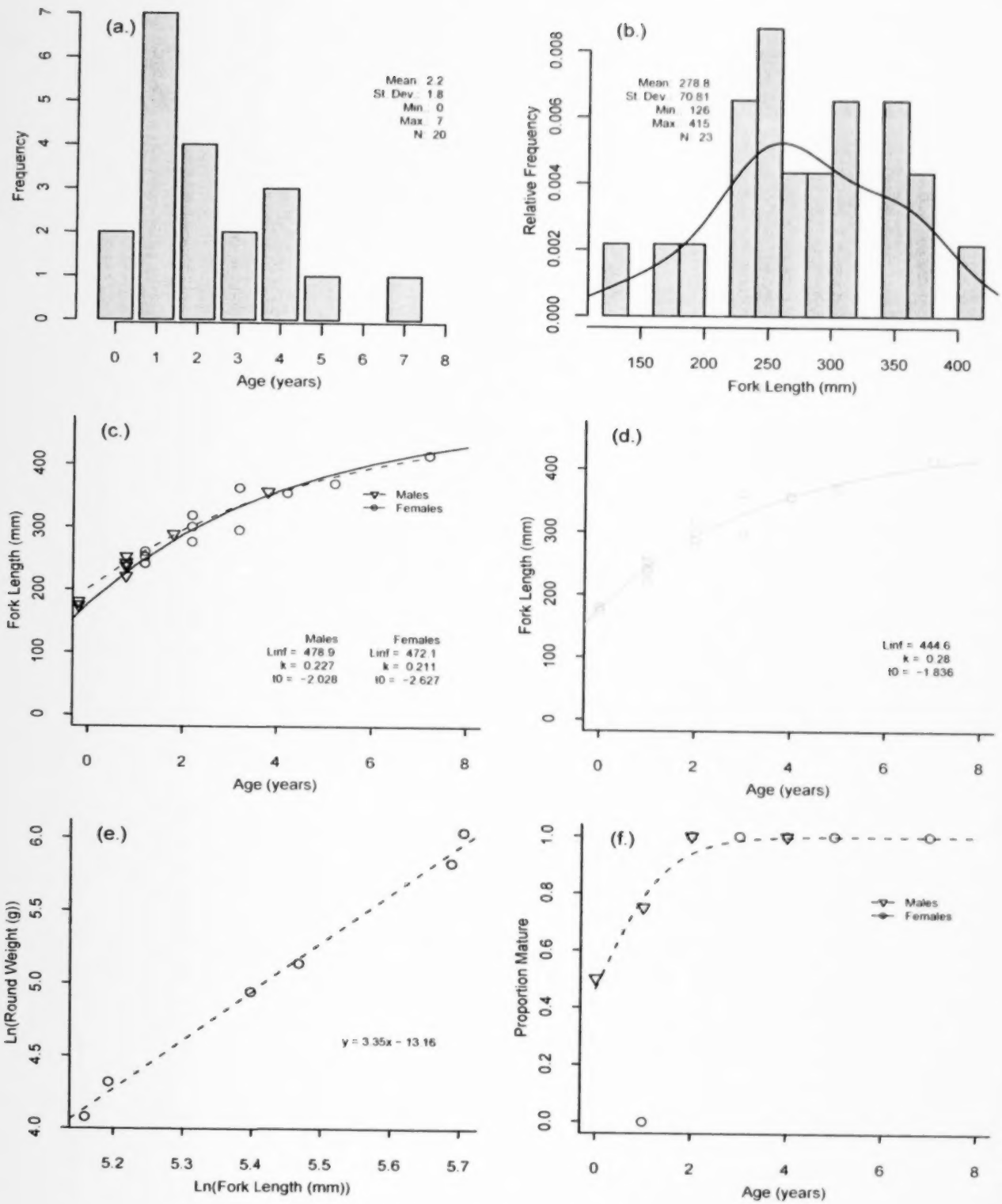

Figure 13. Lake herring fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the Southampton project (LHA_IA07_005), September 2007.

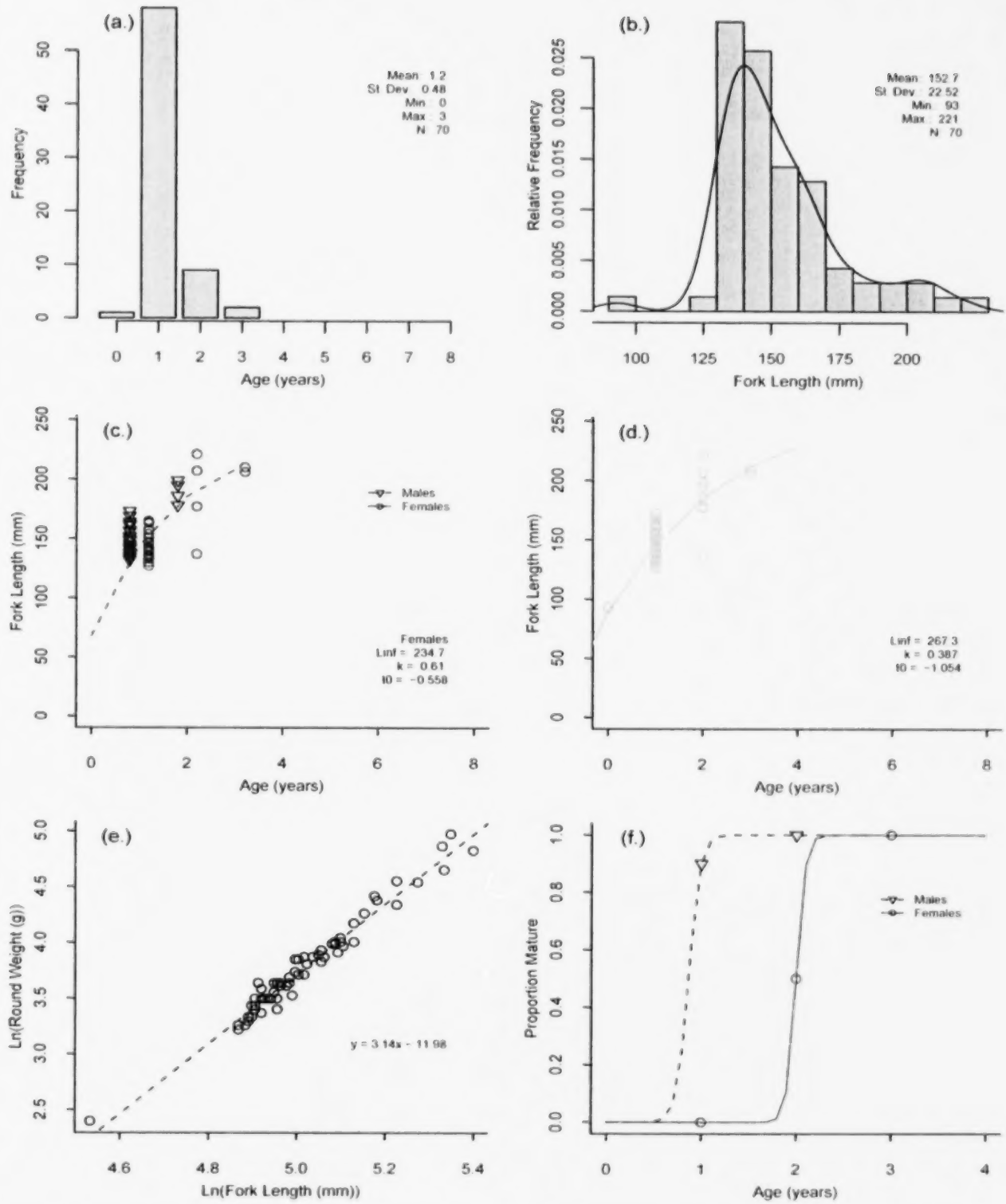

Figure 14. Yellow perch fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the Southampton project (LHA_IA07_005), September 2007.

Southern Lake Huron (Spring) [LHA_1A07_006]

This project was conducted in southern Lake Huron near Grand Bend between June 13 and June 28 (Table 7). The depth of the nets ranged between 9.8 m and 64.7 m. All 30 net sets were approximately 24 hours in duration. Lake whitefish, chub, and yellow perch were sought. The position of each net is shown in Figure 15.

Twelve fish species were caught during this project (Table 8). The catch was dominated by yellow perch (48.4 % of catch). Lake whitefish were the second most abundant species (24.8 %) followed by white sucker (8.8 %). Plots of the biological attributes of the lake trout (Figure 16), lake whitefish (Figure 17), deepwater chub (Figure 18), and yellow perch (Figure 19) captured during this project were constructed.

Average CPUE for this project was 42.8 fish/night, less than half that observed last year. The average CPUE of yellow perch dropped from 135.0 last year to 44.0 this year. High average CPUE was observed for lake whitefish (18.2) and gizzard shad (*Dorosoma cepedianum*) (13.0). Most of the yellow perch were caught in 38 mm and 51 mm mesh.

Table 7. Set information for the fishing gear deployed in the spring in the southern main basin during the 2007 offshore index program.

Sample Number	Set Date	Latitude	Longitude	Gear Code	Effort Duration (hrs)	Average Depth (m)
601	13-Jun-07	43° 38.77'	-81° 55.92'	GL32	16.50	64.7
602	13-Jun-07	43° 38.29'	-81° 56.31'	GL32	16.86	64.7
603	13-Jun-07	43° 38.02'	-81° 54.98'	GL32	15.45	58.2
604	14-Jun-07	43° 16.73'	-81° 53.05'	GL32	20.20	14.6
605	14-Jun-07	43° 16.90'	-81° 51.77'	GL32	20.50	13.5
606	14-Jun-07	43° 17.05'	-81° 50.89'	GL32	20.71	12.2
607	20-Jun-07	43° 25.36'	-81° 56.36'	GL32	19.58	34.8
608	20-Jun-07	43° 24.99'	-81° 57.04'	GL32	19.86	35.4
609	20-Jun-07	43° 24.52'	-81° 55.81'	GL32	20.16	31.5
610	21-Jun-07	43° 33.13'	-81° 52.14'	GL32	20.75	31.0
611	21-Jun-07	43° 32.65'	-81° 52.69'	GL32	20.06	32.0
612	21-Jun-07	43° 32.45'	-81° 51.70'	GL32	19.35	27.9
613	22-Jun-07	43° 35.48'	-81° 47.88'	GL32	23.13	19.6
614	22-Jun-07	43° 34.91'	-81° 48.25'	GL32	23.30	19.5
615	22-Jun-07	43° 34.98'	-81° 47.14'	GL32	22.33	17.8
616	23-Jun-07	43° 19.29'	-81° 50.96'	GL32	20.53	16.1
617	23-Jun-07	43° 18.67'	-81° 51.37'	GL32	20.85	16.0
618	23-Jun-07	43° 18.18'	-81° 50.72'	GL32	21.16	14.2
619	24-Jun-07	43° 17.90'	-81° 58.21'	GL32	22.76	24.4
620	24-Jun-07	43° 17.91'	-81° 57.29'	GL32	21.93	23.1
621	24-Jun-07	43° 18.70'	-81° 57.60'	GL32	21.20	25.3
622	25-Jun-07	43° 21.18'	-82° 02.31'	GL32	22.58	36.1
623	25-Jun-07	43° 21.63'	-82° 01.62'	GL32	22.78	36.4
624	25-Jun-07	43° 20.51'	-82° 00.97'	GL32	23.03	34.2
625	26-Jun-07	43° 32.49'	-81° 58.13'	GL32	20.58	62.5
626	26-Jun-07	43° 33.20'	-81° 57.89'	GL32	19.75	64.0
627	26-Jun-07	43° 33.06'	-81° 55.32'	GL32	18.73	49.2
628	27-Jun-07	43° 33.33'	-81° 43.80'	GL32	18.61	9.9
629	27-Jun-07	43° 32.73'	-81° 43.51'	GL32	19.30	9.8
630	27-Jun-07	43° 32.66'	-81° 47.25'	GL32	20.46	17.4

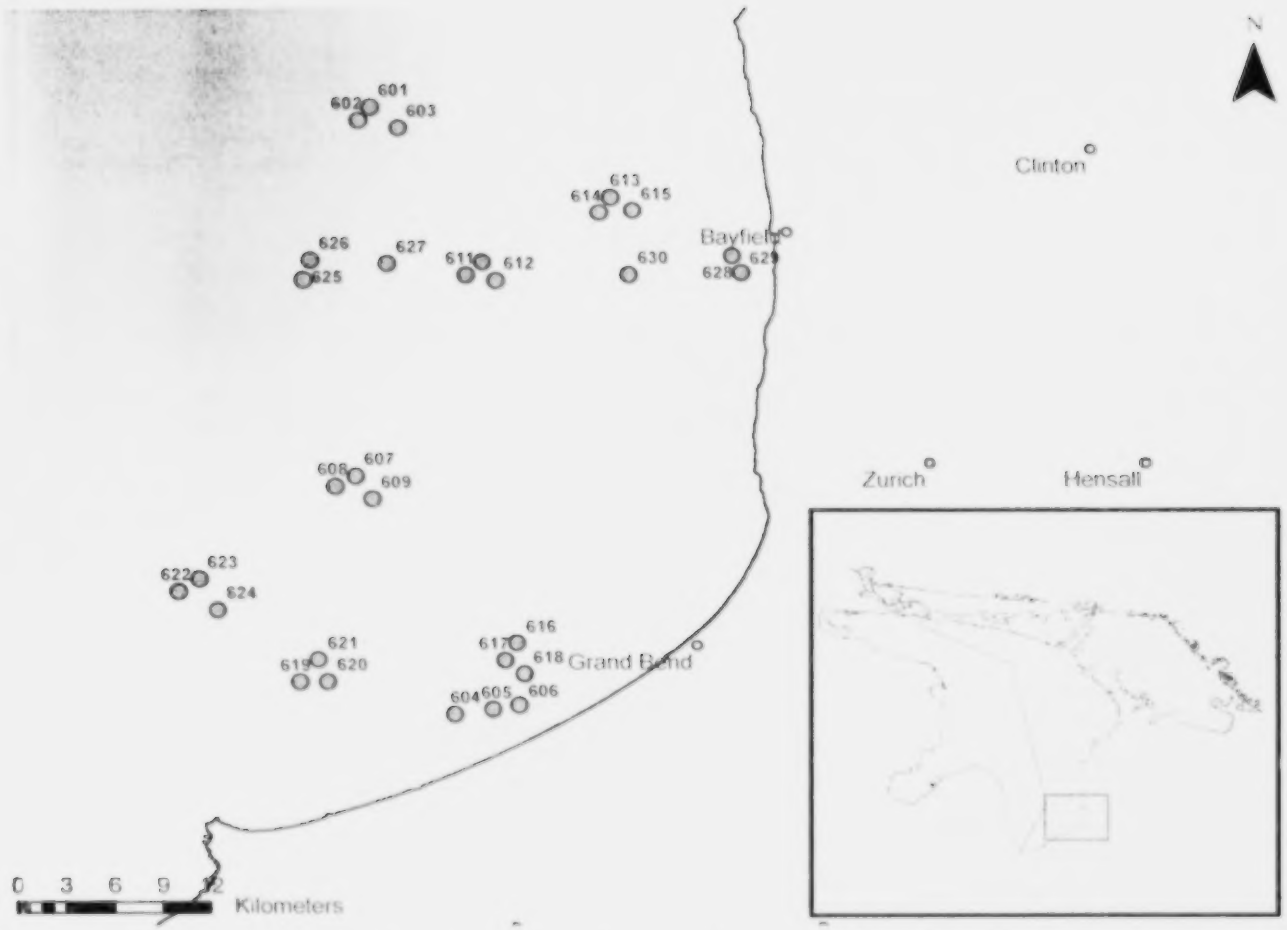

Figure 15. Offshore index sampling locations in the southern main basin near Grand Bend during 2007 (project code LHA_IA07_006) during the spring (June). Deepwater chub, lake whitefish, and yellow perch were targeted.

Table 8. Count of the number of fish by species caught in each mesh size of the gill nets set in the southern main basin in the spring during the 2007 offshore index program. Catch per unit effort (CPUE) is the mean number of fish caught per net each night.

	Mesh Size (mm)										
Species	**032**	**038**	**051**	**064**	**076**	**089**	**102**	**114**	**127**	**Total**	**CPUE**
Channel Catfish							1			1	1.00
Chinook Salmon									1	1	1.00
Chub	57	49	3							109	10.60
Gizzard Shad						11	1	1		13	13.00
Lake Herring	2	9	3							14	2.00
Lake Trout			4	2	7	4	5	2	3	27	1.50
Lake Whitefish	23	17	148	75	17	11	15	8	4	318	18.23
Longnose Sucker			3	5	23	10	2			43	4.78
Round Goby	2									2	2.00
Walleye					3	15	3			21	3.00
White Sucker			5	28	32	37	10	1		113	9.42
Yellow Perch	108	232	220	46	14	1				621	44.00
Total	192	307	386	156	96	89	37	12	8	1283	

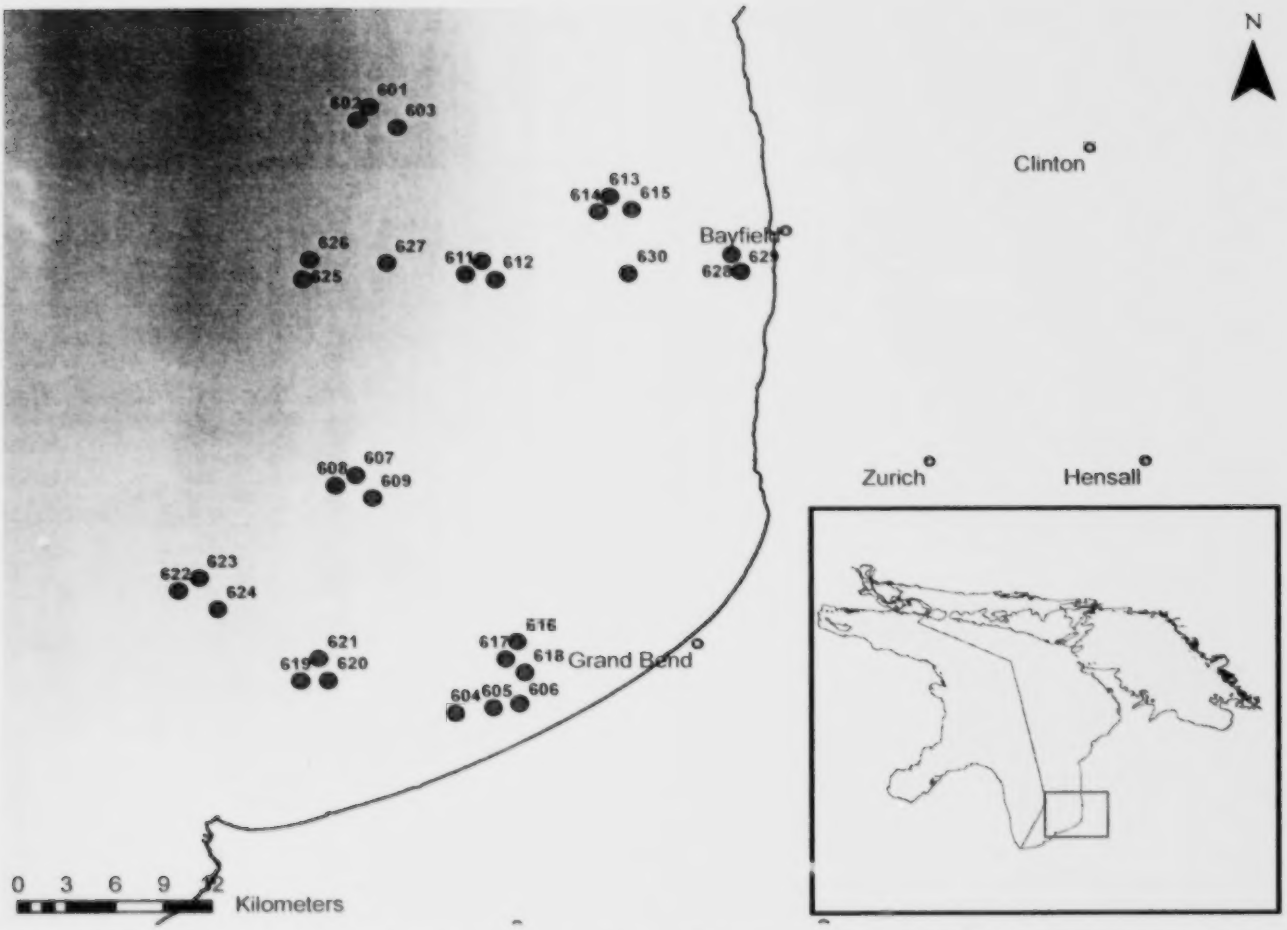

Figure 15. Offshore index sampling locations in the southern main basin near Grand Bend during 2007 (project code LHA_IA07_006) during the spring (June). Deepwater chub, lake whitefish, and yellow perch were targeted.

Table 8. Count of the number of fish by species caught in each mesh size of the gill nets set in the southern main basin in the spring during the 2007 offshore index program. Catch per unit effort (CPUE) is the mean number of fish caught per net each night.

	Mesh Size (mm)										
Species	**032**	**038**	**051**	**064**	**076**	**089**	**102**	**114**	**127**	**Total**	**CPUE**
Channel Catfish							1			1	1.00
Chinook Salmon									1	1	1.00
Chub	57	49	3							109	10.60
Gizzard Shad						11	1	1		13	13.00
Lake Herring	2	9	3							14	2.00
Lake Trout			4	2	7	4	5	2	3	27	1.50
Lake Whitefish	23	17	148	75	17	11	15	8	4	318	18.23
Longnose Sucker			3	5	23	10	2			43	4.78
Round Goby	2									2	2.00
Walleye					3	15	3			21	3.00
White Sucker			5	28	32	37	10	1		113	9.42
Yellow Perch	108	232	220	46	14	1				621	44.00
Total	192	307	386	156	96	89	37	12	8	1283	

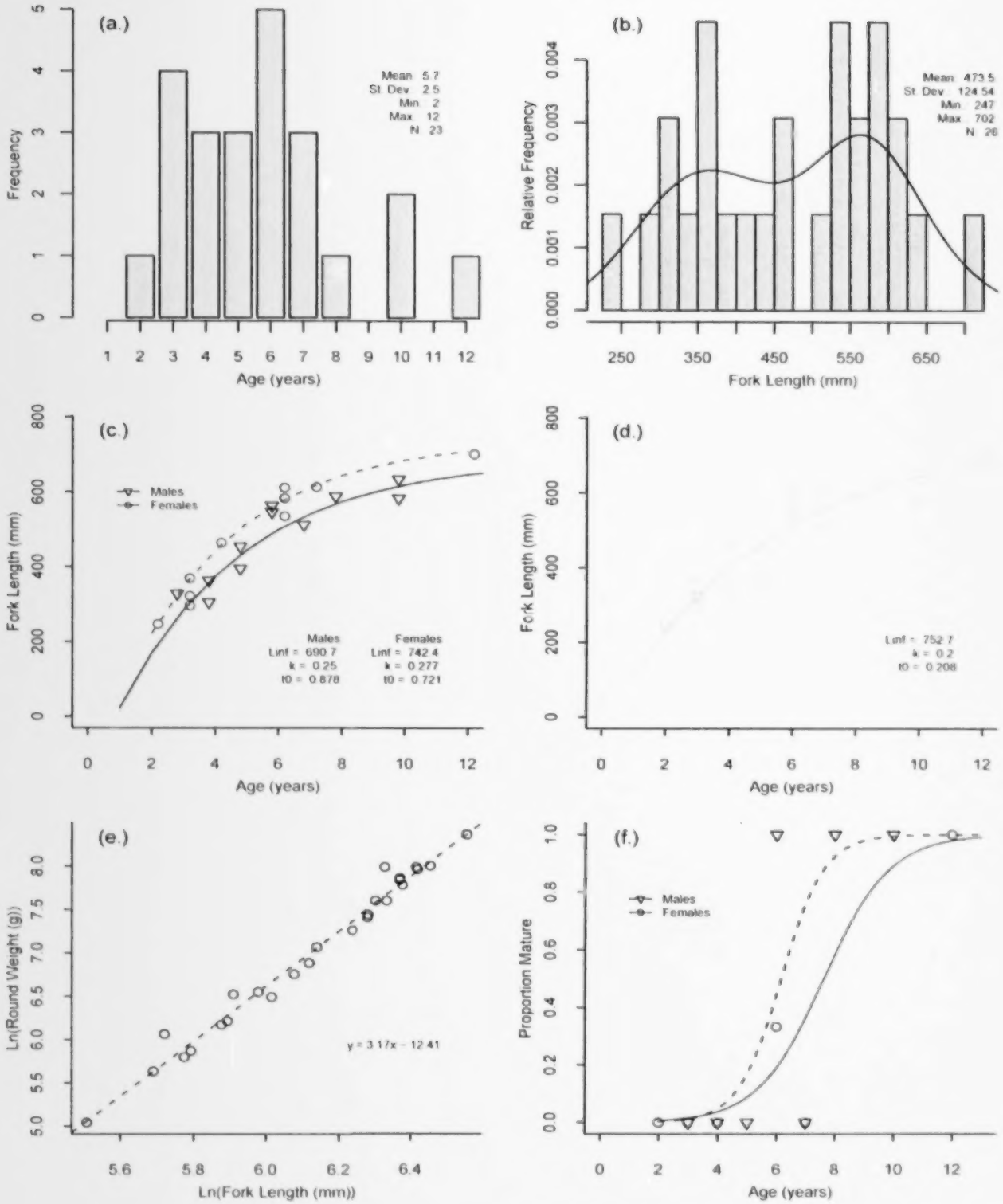

Figure 16. Lake trout fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the Grand Bend project (LHA_IA07_006), June 2007.

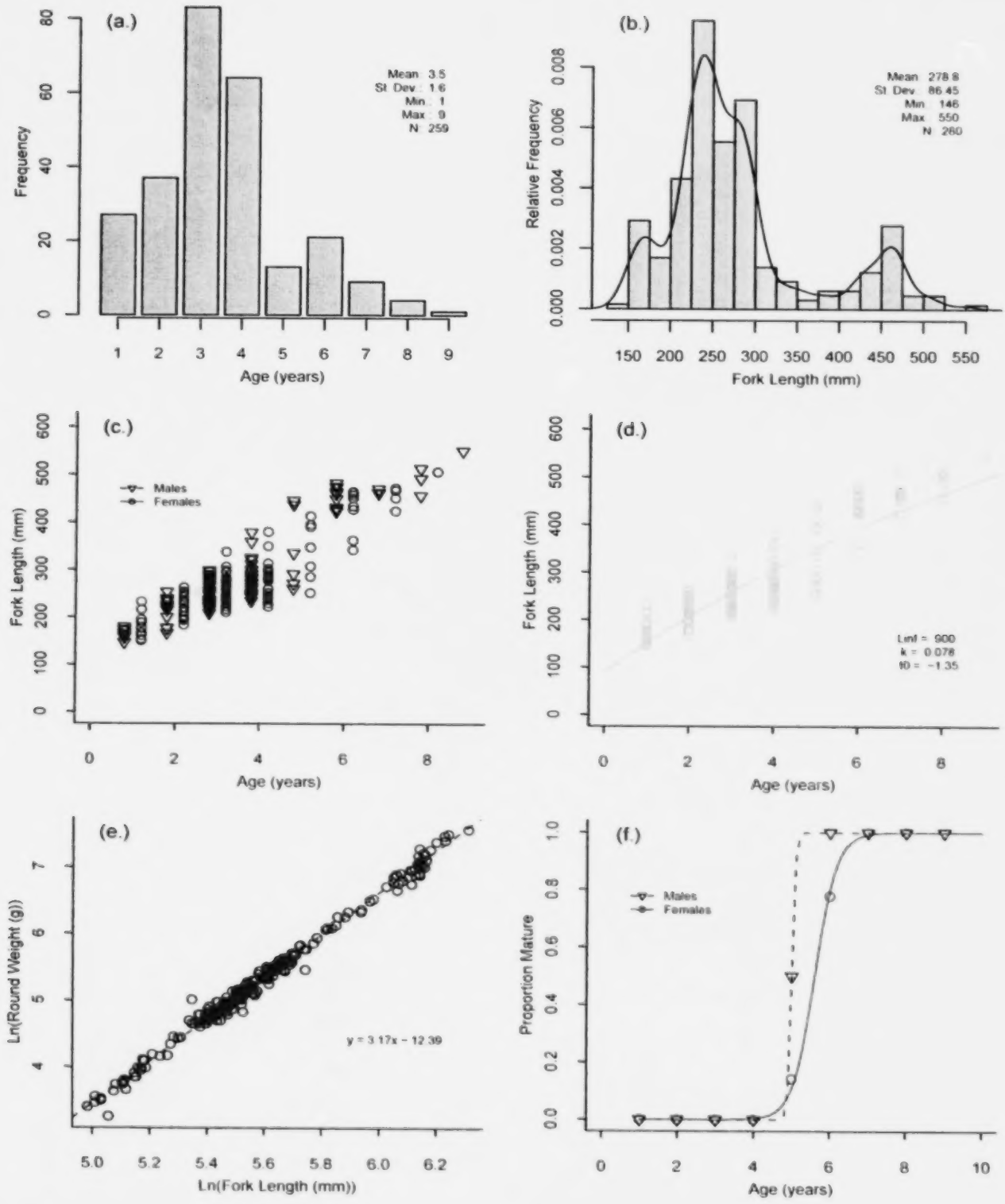

Figure 17. Lake whitefish fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the Grand Bend project (LHA_IA07_006), June 2007.

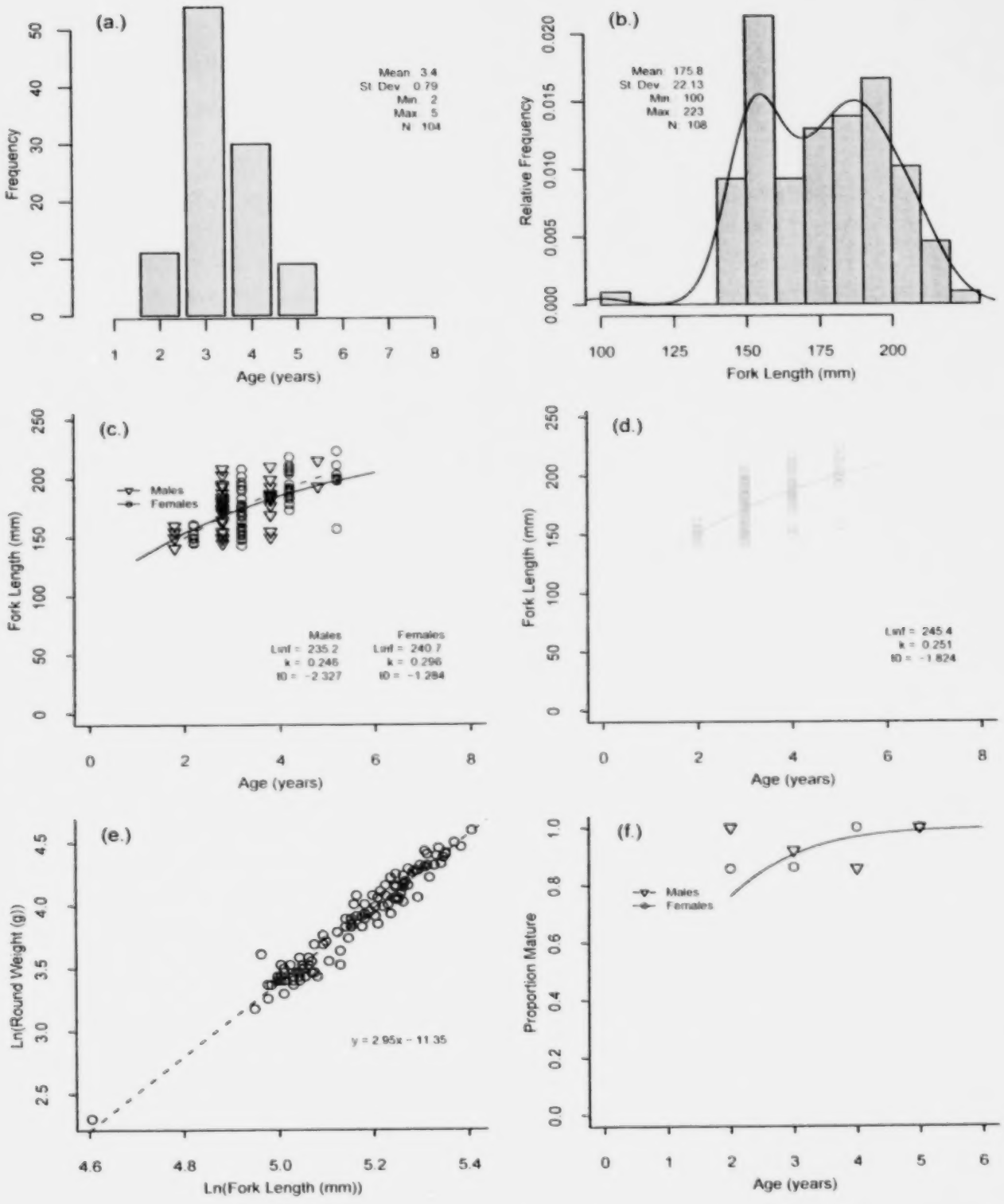

Figure 18. Chub fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the Grand Bend project (LHA_IA07_006), June 2007.

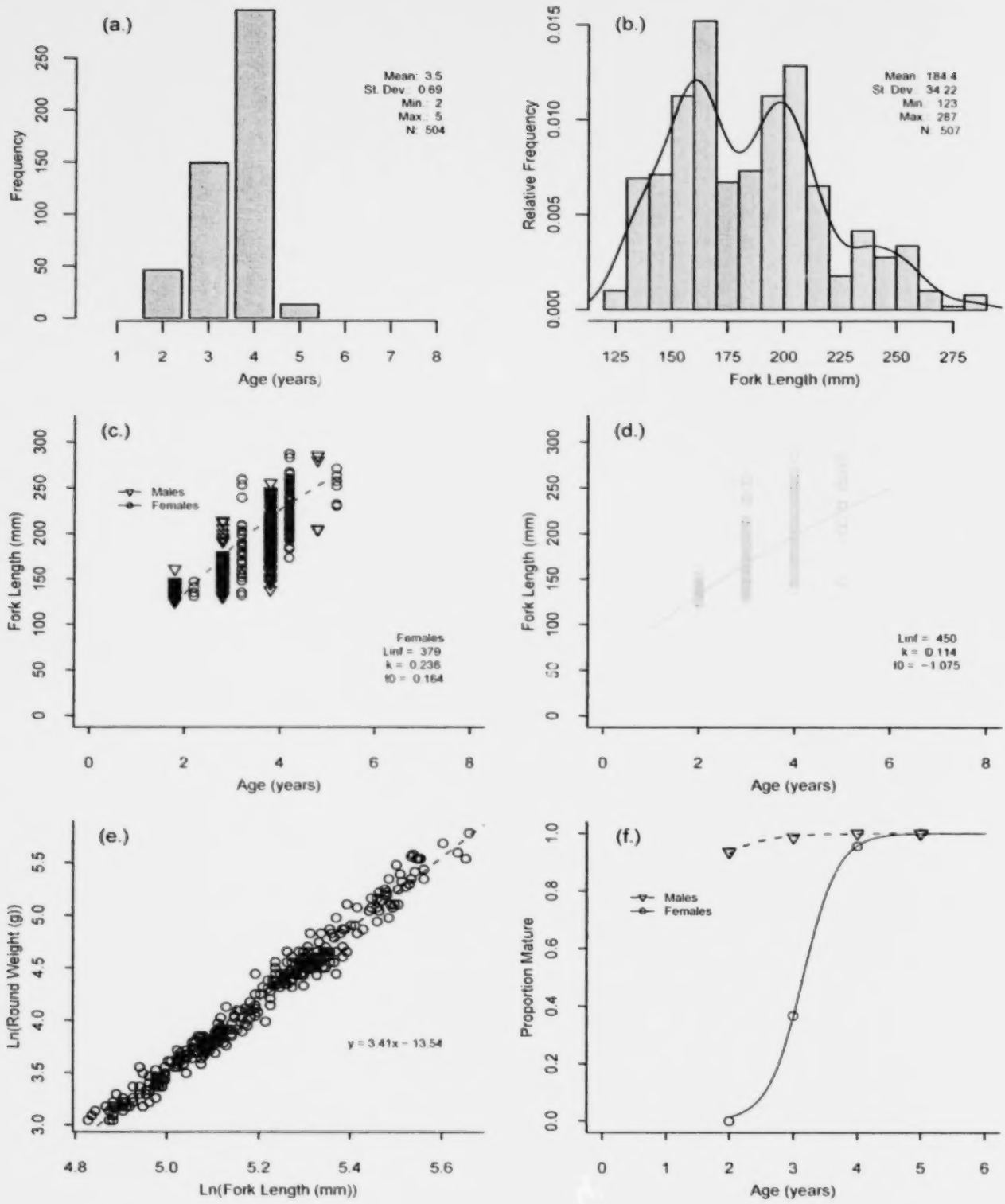

Figure 19. Yellow perch fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the Grand Bend project (LHA_IA07_006), June 2007.

Southern Lake Huron (Fall) **[LHA_IA07_006]**

This project was conducted in southern Lake Huron near Grand Bend between September 29 and October 10 (Table 9). The depth of the nets ranged between 13.6 m and 64.6 m. Six of the 18 nets fished for more than one night due to inclement weather creating unsafe work conditions. Lake whitefish and yellow perch were targeted. The position of each net is shown in Figure 20.

Fifteen fish species were caught during this project (Table 10). The species caught with the highest frequency was yellow perch (70.7 % of the catch), a change from gizzard shad last year. The other two most frequently caught species during this year's program were lake whitefish (8.5 %) and deepwater chub (6.8 %). Plots of the biological attributes of the lake trout (Figure 21), lake whitefish (Figure 22), lake herring (Figure 23), deepwater chub (Figure 24), yellow perch (Figure 25), and walleye (*Sander vitreus*) (Figure 26) captured during this project were constructed.

Average CPUE for this project was 92.7 fish/night. Yellow perch had the highest mean CPUE (131.1), followed by lake whitefish (9.9), and lake herring (8.7). The CPUE of lake herring increased by a factor of three from last year. Although none of the nets targeted deepwater chub they were caught in nets targeting lake whitefish and yellow perch. Deepwater chub were only caught in mesh sizes less than 64 mm.

Table 9. Set information for the fishing gear deployed in the fall in the southern main basin during the 2007 offshore index program.

Sample Number	Set Date	Latitude	Longitude	Gear Code	Effort Duration (hrs)	Average Depth (m)
651	29-Sep-07	43° 38.45'	-81° 56.19'	GL32	17.50	64.6
652	29-Sep-07	43° 37.79'	-81° 56.59'	GL32	16.75	64.1
653	29-Sep-07	43° 37.58'	-81° 54.98'	GL32	16.03	56.9
654	30-Sep-07	43° 25.45'	-81° 56.49'	GL32	21.16	35.0
655	30-Sep-07	43° 24.86'	-81° 57.04'	GL32	21.48	34.5
656	30-Sep-07	43° 24.74'	-81° 55.61'	GL32	21.71	30.6
657	01-Oct-07	43° 17.38'	-81° 56.51'	GL32	23.03	19.8
658	01-Oct-07	43° 17.89'	-81° 55.79'	GL32	22.38	19.2
659	01-Oct-07	43° 17.20'	-81° 55.32'	GL32	21.70	18.1
660	02-Oct-07	43° 20.86'	-82° 03.38'	GL32	46.80	34.6
661	02-Oct-07	43° 20.76'	-82° 02.49'	GL32	46.11	34.7
662	02-Oct-07	43° 22.06'	-82° 03.07'	GL32	45.21	37.2
663	04-Oct-07	43° 18.27'	-81° 51.42'	GL32	20.86	15.0
664	04-Oct-07	43° 18.87'	-81° 50.79'	GL32	21.30	14.8
665	04-Oct-07	43° 18.36'	-81° 50.18'	GL32	22.01	13.6
666	09-Oct-07	43° 35.49'	-81° 48.40'	GL32	44.38	19.6
667	09-Oct-07	43° 34.82'	-81° 47.96'	GL32	44.73	18.8
668	09-Oct-07	43° 34.74'	-81° 47.35'	GL32	44.98	17.4

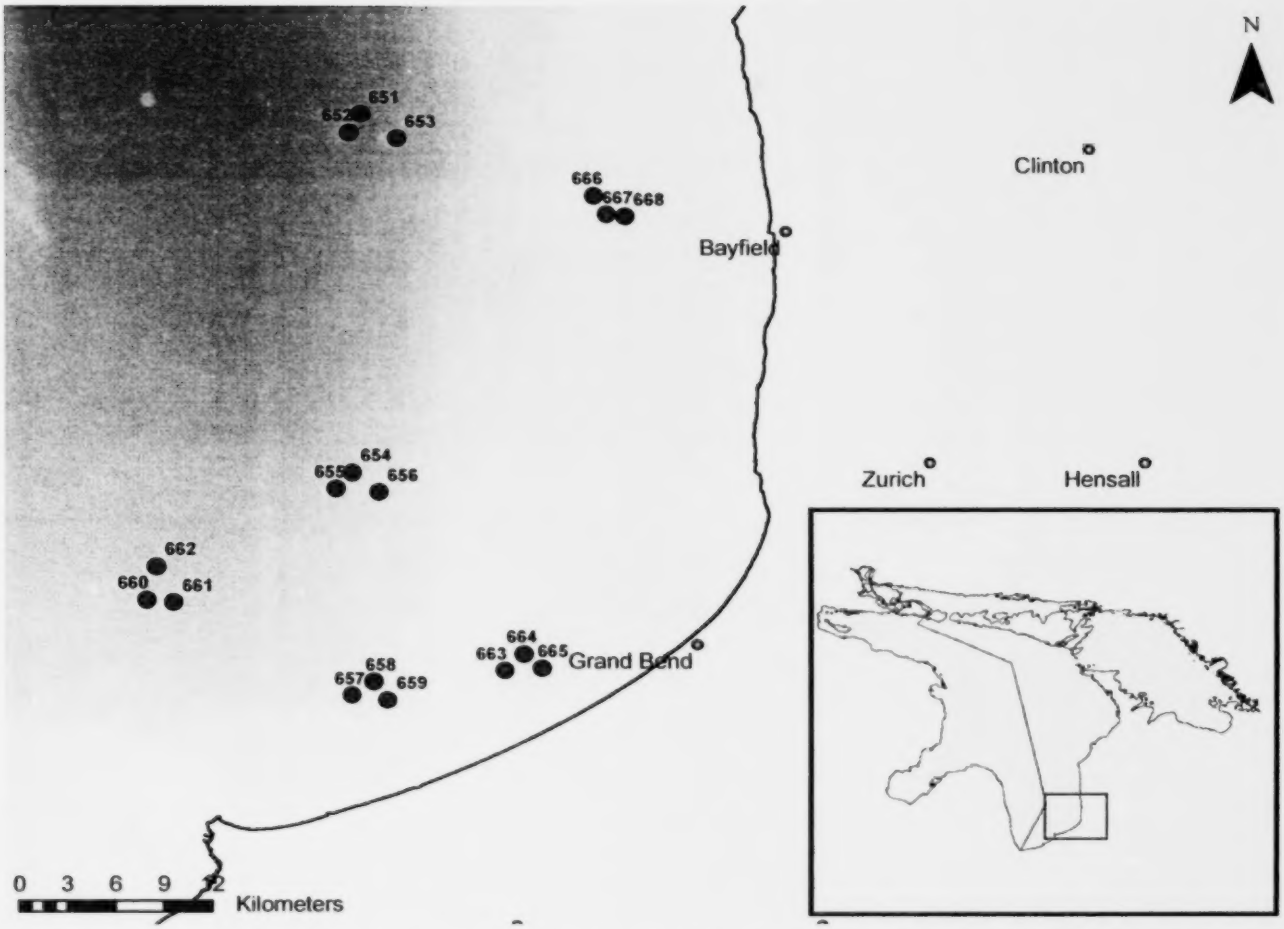

Figure 20. Offshore index sampling locations in the southern main basin near Grand Bend during 2007 (project code LHA_IA07_006) during the fall (September and October). Lake whitefish and yellow perch were targeted.

Table 10. Count of the number of fish by species caught in each mesh size of the gill nets set in the southern main basin in the fall during the 2007 offshore index program. Catch per unit effort (CPUE) is the mean number of fish caught per net each night.

	Mesh Size (mm)										
Species	**032**	**038**	**051**	**064**	**076**	**089**	**102**	**114**	**127**	**Total**	**CPUE**
Channel Catfish								1		1	0.71
Chinook Salmon			6	6	3					15	2.34
Chub	93	33	3							129	0.00
Gizzard Shad							1	1	1	3	0.88
Lake Herring	6	11	9							26	8.67
Lake Trout		1	2	5	7	1	7	11	6	40	2.86
Lake Whitefish		8	63	62	16	4	2	3	3	161	9.90
Longnose Sucker				2	1	1	3		1	8	1.29
Rainbow Smelt	22	4	6	3	3					38	6.55
Rainbow Trout						1				1	0.71
Round Goby	3									3	0.71
Walleye		1	1	4	10	23	13	5	4	61	5.00
White Bass							1	1		2	1.00
White Sucker		1	10	16	18	11	8	2		66	7.17
Yellow Perch	230	421	483	162	40	1				1337	131.08
Total	354	480	583	260	98	42	35	24	15	1891	

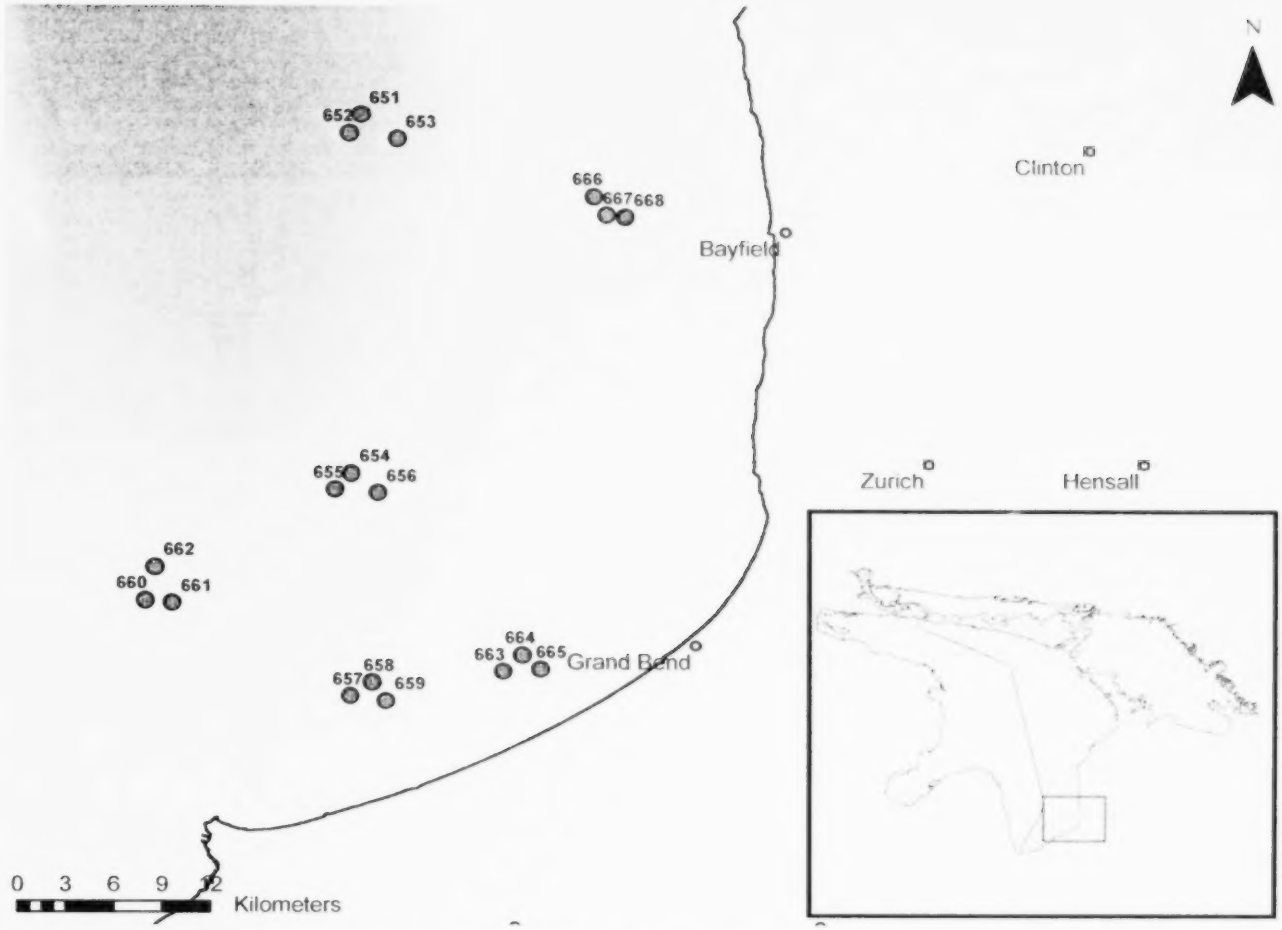

Figure 20. Offshore index sampling locations in the southern main basin near Grand Bend during 2007 (project code LHA_IA07_006) during the fall (September and October). Lake whitefish and yellow perch were targeted.

Table 10. Count of the number of fish by species caught in each mesh size of the gill nets set in the southern main basin in the fall during the 2007 offshore index program. Catch per unit effort (CPUE) is the mean number of fish caught per net each night.

	Mesh Size (mm)										
Species	**032**	**038**	**051**	**064**	**076**	**089**	**102**	**114**	**127**	**Total**	**CPUE**
Channel Catfish								1		1	0.71
Chinook Salmon			6	6	3					15	2.34
Chub	93	33	3							129	0.00
Gizzard Shad							1	1	1	3	0.88
Lake Herring	6	11	9							26	8.67
Lake Trout		1	2	5	7	1	7	11	6	40	2.86
Lake Whitefish		8	63	62	16	4	2	3	3	161	9.90
Longnose Sucker				2	1	1	3		1	8	1.29
Rainbow Smelt	22	4	6	3	3					38	6.55
Rainbow Trout						1				1	0.71
Round Goby	3									3	0.71
Walleye		1	1	4	10	23	13	5	4	61	5.00
White Bass							1	1		2	1.00
White Sucker		1	10	16	18	11	8	2		66	7.17
Yellow Perch	230	421	483	162	40	1				1337	131.08
Total	354	480	583	260	98	42	35	24	15	1891	

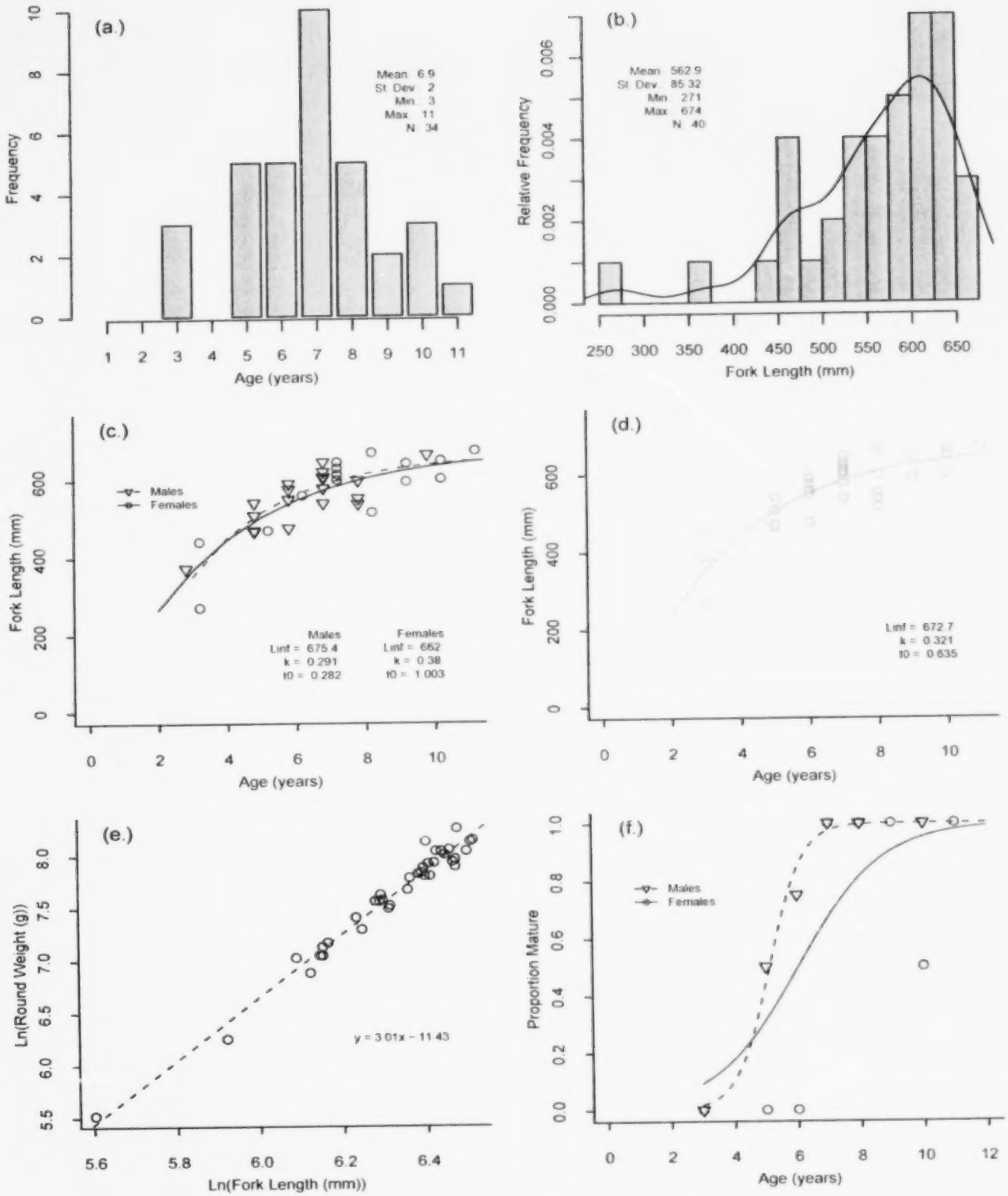

Figure 21. Lake trout fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the Grand Bend project (LHA_IA07_006), September 2007.

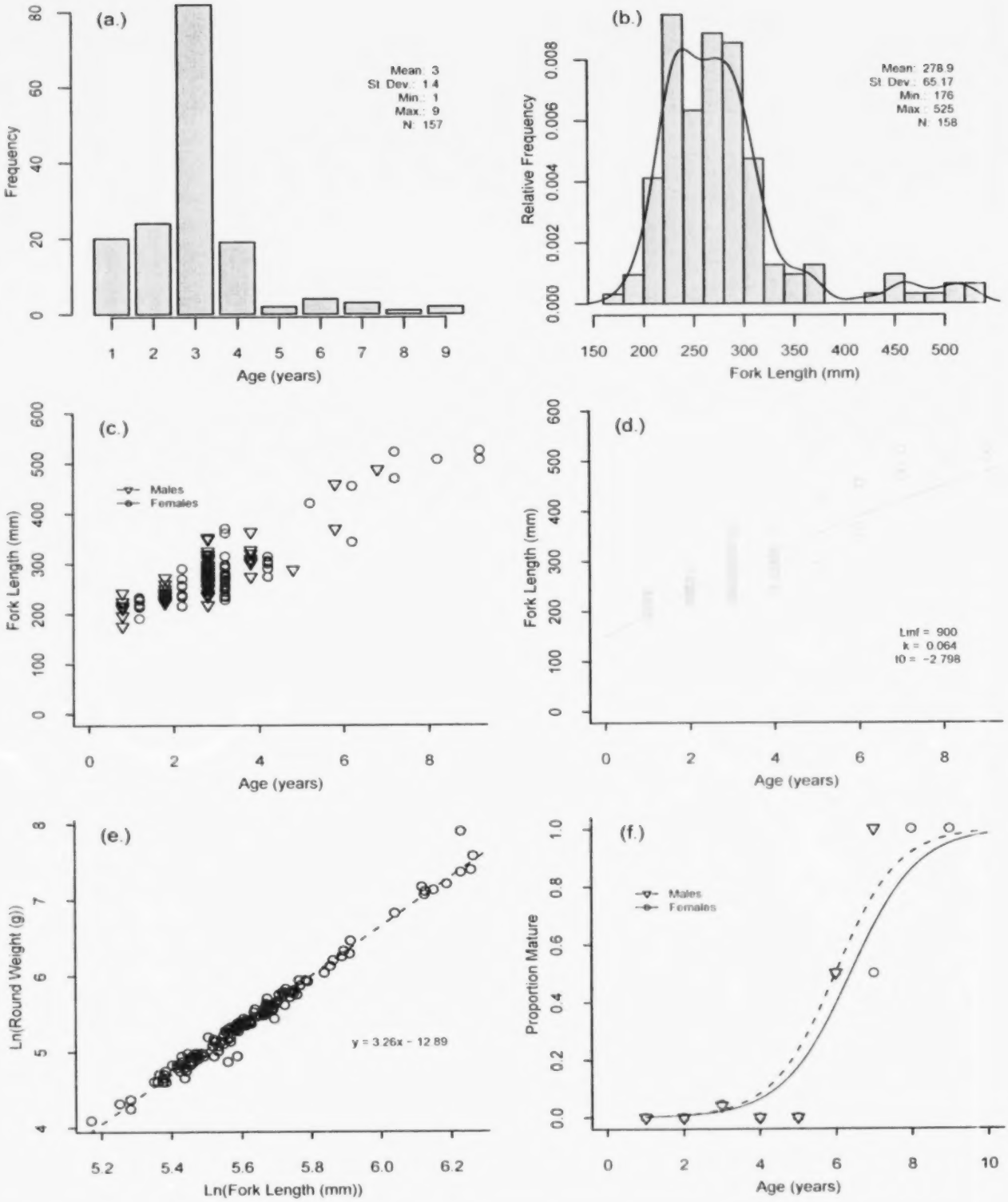

Figure 22. Lake whitefish fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the Grand Bend project (LHA_IA07_006), September 2007.

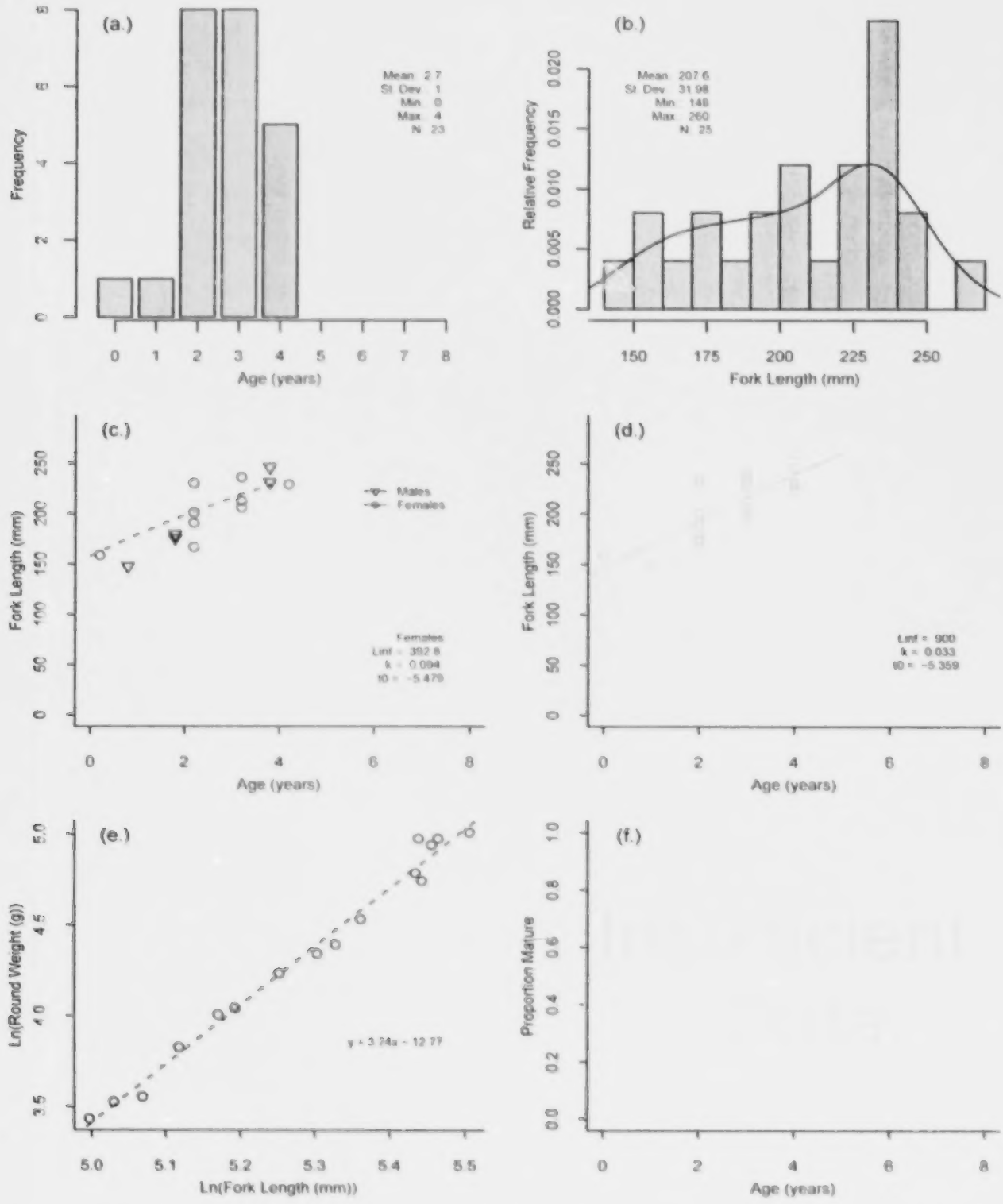

Figure 23. Lake herring fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the Grand Bend project (LHA_IA07_006), September 2007.

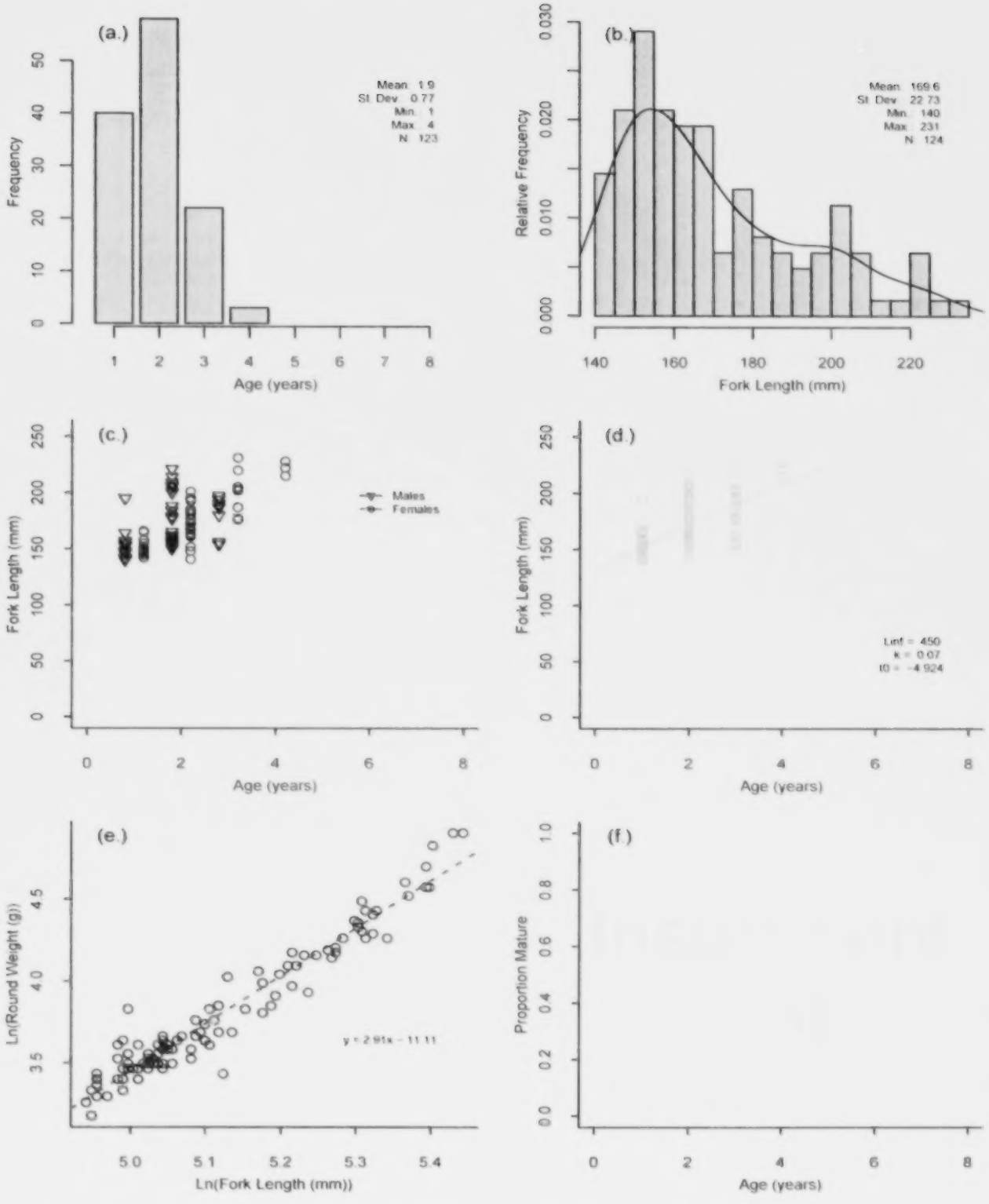

Figure 24. Chub fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the Grand Bend project (LHA_IA07_006), September 2007.

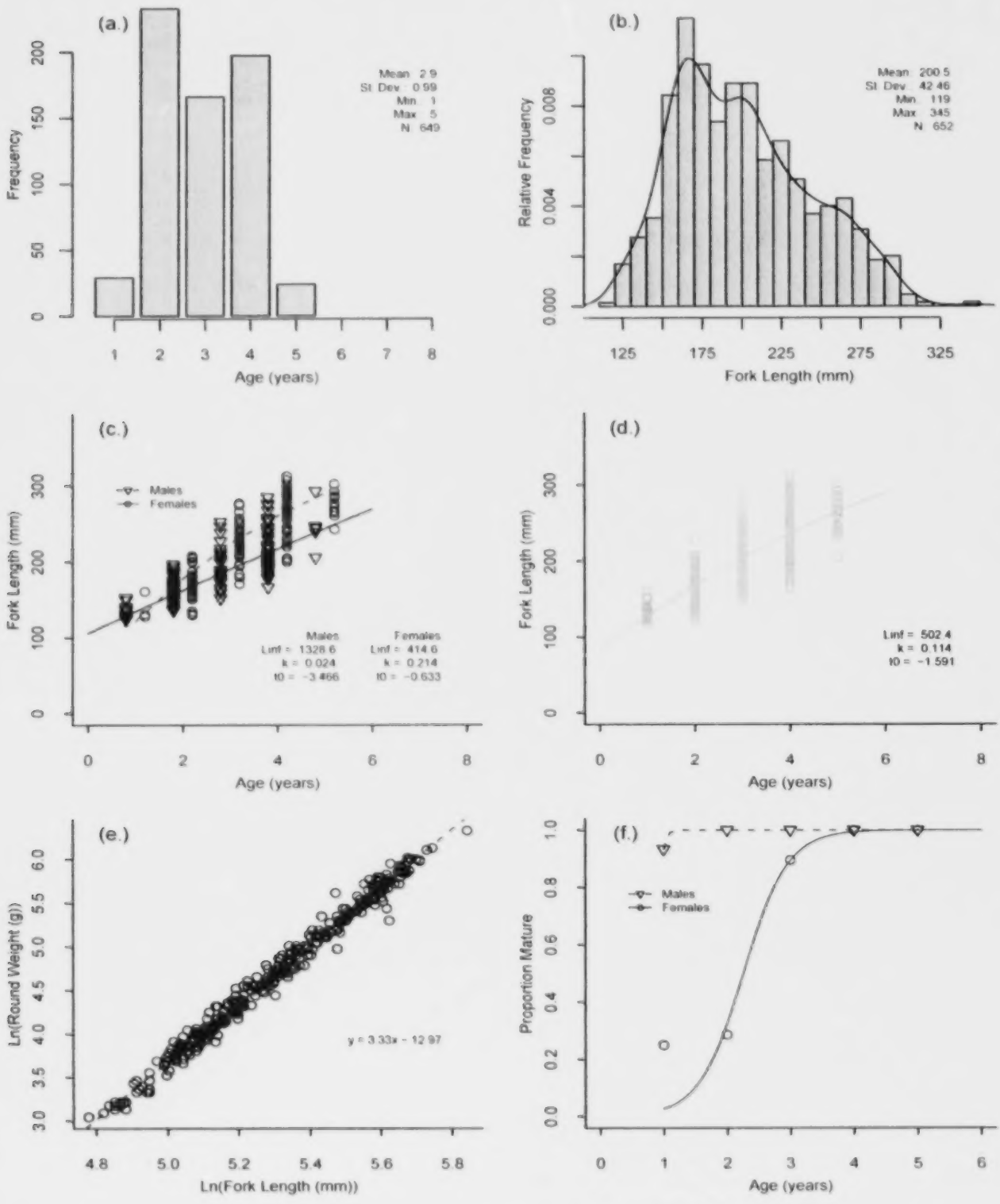

Figure 25. Yellow perch fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the Grand Bend project (LHA_IA07_006), September 2007.

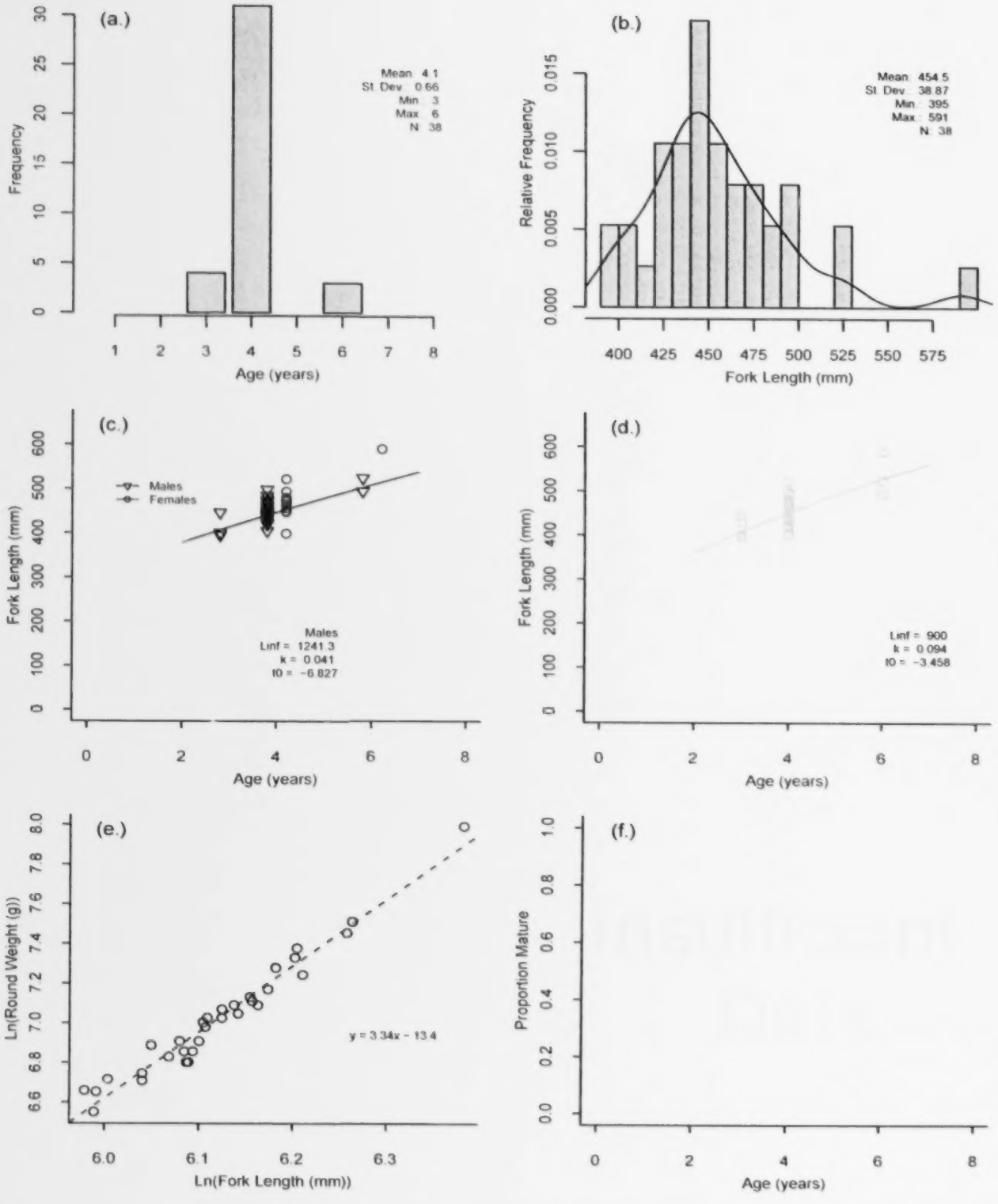

Figure 26. Walleye fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the Grand Bend project (LHA_IA07_006), September 2007.

North Channel [LHA_IA07_007]

This project was conducted in the North Channel near Clapperton Island between July 6 and July 11 (Table 11). The depth of the nets ranged between 8.9 m and 18.5 m. All 15 net sets were approximately 24 hours in duration. Only yellow perch were targeted. The position of each net is shown in Figure 27.

Fifteen fish species were caught during this project (Table 12), a decrease from the record 18 species caught last year. The most common species caught this year were yellow perch (71.4 % of the catch), white sucker (11.8 %), and rainbow smelt (5.6 %). Round gobies (*Neogobius melanostomus*) were first caught in this location last year. They were caught again this year. Plots of the biological attributes of the lake herring (Figure 28) and yellow perch (Figure 29) captured during this project were constructed.

Average CPUE for this project was 80.9 fish/night. Yellow perch had the highest mean CPUE (57.7), followed by white sucker (10.2) and rainbow smelt (5.7). Most of the yellow perch were caught mesh sizes smaller than 64 mm, while rainbow smelt and white sucker were caught in most mesh sizes.

Table 11. Set information for the fishing gear deployed in the North Channel during the 2007 offshore index program.

Sample Number	Set Date	Latitude	Longitude	Gear Code	Effort Duration (hrs)	Average Depth (m)
701	06-Jul-07	46° 03.19'	-82° 18.95'	GL32	23.65	9.6
702	06-Jul-07	46° 02.64'	-82° 19.21'	GL32	23.81	11.4
703	06-Jul-07	46° 02.53'	-82° 19.26'	GL32	23.90	18.5
704	07-Jul-07	46° 03.72'	-82° 08.14'	GL32	22.03	11.0
705	07-Jul-07	46° 03.66'	-82° 07.11'	GL32	21.15	14.4
706	07-Jul-07	46° 03.02'	-82° 06.55'	GL32	20.54	11.6
707	08-Jul-07	46° 01.83'	-82° 11.06'	GL32	22.01	13.0
708	08-Jul-07	46° 01.11'	-82° 11.42'	GL32	22.26	10.8
709	08-Jul-07	46° 00.90'	-82° 11.01'	GL32	22.48	13.6
710	09-Jul-07	45° 59.78'	-82° 11.62'	GL32	22.53	11.5
711	09-Jul-07	46° 00.14'	-82° 10.93'	GL32	21.60	15.1
712	09-Jul-07	46° 00.42'	-82° 11.50'	GL32	23.13	11.5
713	10-Jul-07	45° 58.56'	-82° 16.26'	GL32	22.00	8.9
714	10-Jul-07	45° 58.02'	-82° 16.85'	GL32	22.26	9.8
715	10-Jul-07	45° 57.79'	-82° 16.72'	GL32	22.45	10.9

Figure 27. Offshore index sampling locations in the North Channel near Clapperton Island during 2007 (project code LHA_IA07_007). Yellow perch were targeted.

Table 12. Count of the number of fish by species caught in each mesh size of the gill nets set in the North Channel during the 2007 offshore index program. Catch per unit effort (CPUE) is the mean number of fish caught per net each night.

	Mesh Size (mm)										
Species	**032**	**038**	**051**	**064**	**076**	**089**	**102**	**114**	**127**	**Total**	**CPUE**
Alewife	4	4								8	1.33
Burbot		1	3	6	6	2				18	2.25
Gizzard Shad						1				1	1.00
Lake Chub	1									1	1.00
Lake Herring		1	5	10	8	2	1			27	2.25
Longnose Sucker				1	1					2	1.00
Rainbow Smelt	4	4	20	20	11	4	3		2	68	5.67
Rock Bass		1			1					2	2.00
Round Goby	36	1								37	4.63
Round Whitefish		1	1		1	1				4	1.00
Smallmouth Bass				1			3	1	2	7	3.50
Trout-perch	20	6								26	2.60
Walleye					2				1	3	1.50
White Sucker			15	6	21	15	34	35	17	143	10.21
Yellow Perch	284	325	194	51	12					866	57.73
Total	349	344	238	95	63	25	41	36	22	1213	

Figure 27. Offshore index sampling locations in the North Channel near Clapperton Island during 2007 (project code LHA_IA07_007). Yellow perch were targeted.

Table 12. Count of the number of fish by species caught in each mesh size of the gill nets set in the North Channel during the 2007 offshore index program. Catch per unit effort (CPUE) is the mean number of fish caught per net each night.

	Mesh Size (mm)										
Species	**032**	**038**	**051**	**064**	**076**	**089**	**102**	**114**	**127**	**Total**	**CPUE**
Alewife	4	4								8	1.33
Burbot		1	3	6	6	2				18	2.25
Gizzard Shad						1				1	1.00
Lake Chub	1									1	1.00
Lake Herring		1	5	10	8	2	1			27	2.25
Longnose Sucker				1	1					2	1.00
Rainbow Smelt	4	4	20	20	11	4	3		2	68	5.67
Rock Bass		1			1					2	2.00
Round Goby	36	1								37	4.63
Round Whitefish		1	1		1	1				4	1.00
Smallmouth Bass				1			3	1	2	7	3.50
Trout-perch	20	6								26	2.60
Walleye					2				1	3	1.50
White Sucker			15	6	21	15	34	35	17	143	10.21
Yellow Perch	284	325	194	51	12					866	57.73
Total	349	344	238	95	63	25	41	36	22	1213	

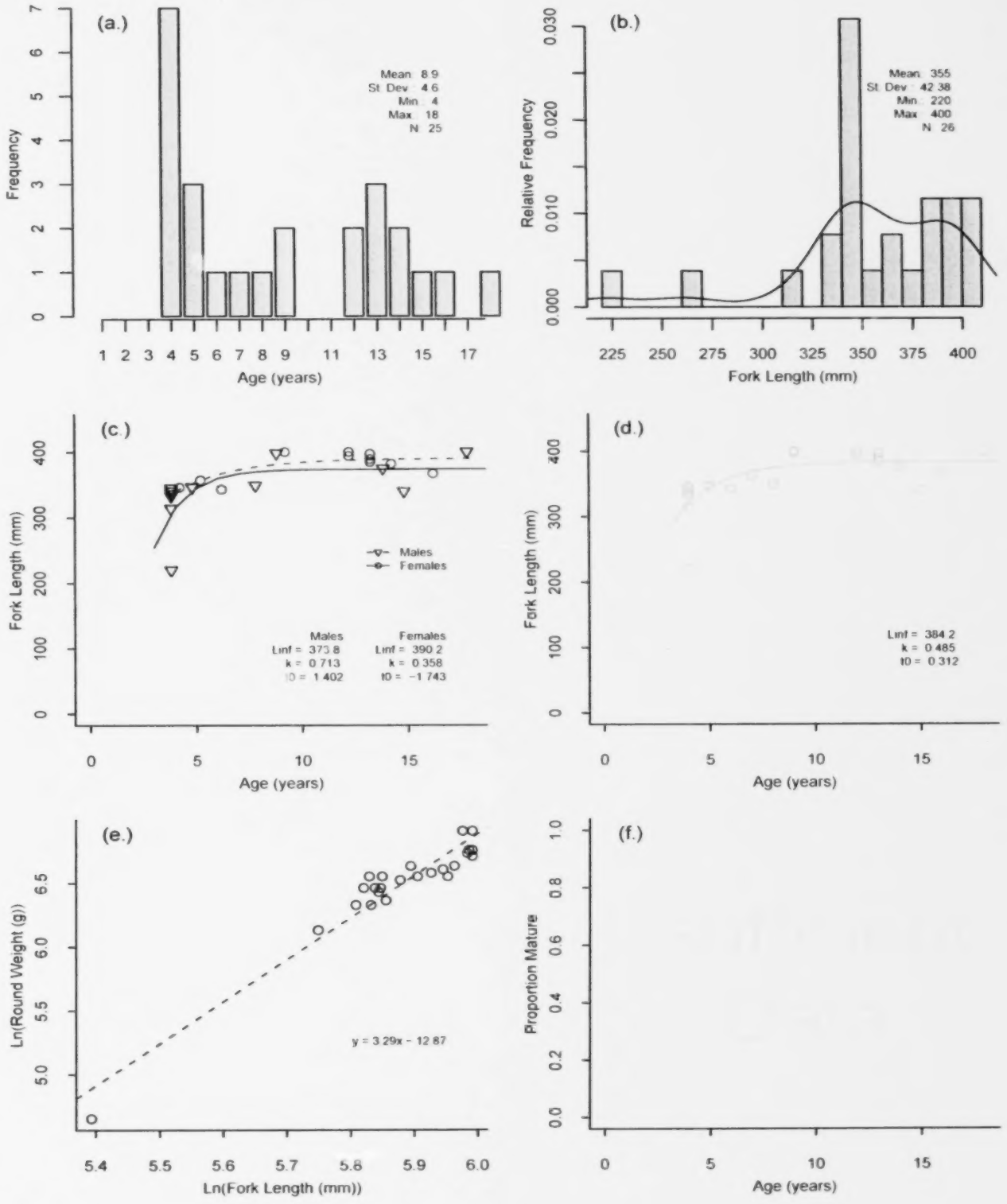

Figure 28. Lake herring fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the 2007 Clapperton Island project (LHA_IA07_007).

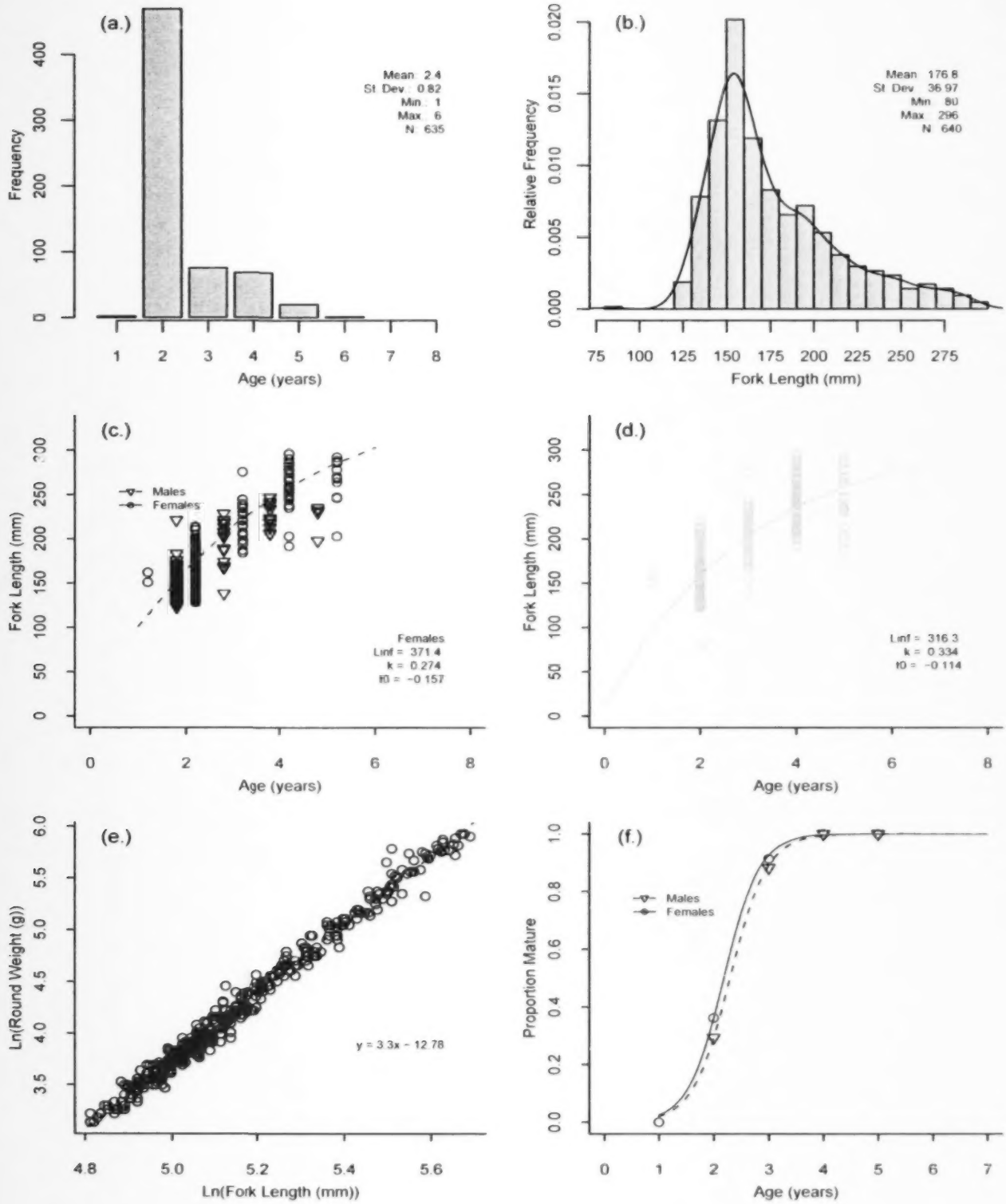

Figure 29. Yellow perch fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the 2007 Clapperton Island project (LHA_IA07_007).

Northern Lake Huron **[LHA_IA07_019]**

This first-time project was conducted in northern Lake Huron near Providence Bay between July 25 and August 01 (Table 13). The depth of the nets ranged between 18.5 m and 86.4 m. The nets were heavily slimed when they were placed at depths less than 50 m. The quantity of slime likely reduced the ability of the nets to catch fish. All 21 net sets were approximately 24 hours in duration. The 114 mm mesh was accidentally excluded from one net set. No specific species was targeted because this was a first-time project. The position of each net is shown in Figure 30.

Ten fish species were caught during this project (Table 14). The most common species were longnose sucker (49.1 % of the catch), lake trout (14.7 %), and lake whitefish (13.4 %). Plots of the biological attributes of the lake trout (Figure 31), lake whitefish (Figure 32), and round whitefish (Figure 33) captured during this project were constructed.

Average CPUE for this project was 10.7 fish/night. Longnose sucker had the highest mean CPUE (18.3), followed by lake chub (5.5) and round whitefish (4.2). Longnose sucker were caught in every mesh size except the smallest, 32 mm.

Table 13. Set information for the fishing gear deployed in the northern main basin during the 2007 offshore index program.

Sample Number	Set Date	Latitude	Longitude	Gear Code	Effort Duration (hrs)	Average Depth (m)
1901	25-Jul-07	45° 35.02'	-82° 21.29'	GL32	15.08	70.5
1902	25-Jul-07	45° 37.10'	-82° 19.15'	GL32	14.39	39.1
1903	25-Jul-07	45° 38.15'	-82° 18.08'	GL32	13.75	22.5
1904	26-Jul-07	45° 36.30'	-82° 24.15'	GL32	21.86	68.3
1905	26-Jul-07	45° 37.15'	-82° 23.27'	GL32	21.20	43.0
1906	26-Jul-07	45° 38.90'	-82° 21.38'	GL32	20.28	20.4
1907	27-Jul-07	45° 36.80'	-82° 27.77'	GL32	23.35	67.4
1908	27-Jul-07	45° 37.99'	-82° 26.42'	GL32	22.46	38.8
1909	27-Jul-07	45° 39.17'	-82° 25.05'	GL32	21.71	20.9
1910	28-Jul-07	45° 37.21'	-82° 31.80'	GL32	23.25	67.6
1911	28-Jul-07	45° 39.34'	-82° 29.19'	GL32	22.20	39.2
1912	28-Jul-07	45° 40.48'	-82° 27.78'	GL32	21.46	18.5
1913	29-Jul-07	45° 33.37'	-82° 19.17'	GL32	21.31	63.7
1914	29-Jul-07	45° 35.38'	-82° 16.93'	GL32	19.88	41.5
1915	29-Jul-07	45° 37.03'	-82° 15.15'	GL32	19.51	23.2
1916	30-Jul-07	45° 30.77'	-82° 16.67'	GL32	23.71	86.4
1917	30-Jul-07	45° 33.28'	-82° 14.12'	GL32	22.26	32.8
1918	30-Jul-07	45° 34.33'	-82° 12.74'	GL32	21.38	19.0
1919	31-Jul-07	45° 30.13'	-82° 11.80'	GL32	22.83	77.8
1920	31-Jul-07	45° 31.93'	-82° 10.06'	GL32	21.88	42.6
1921	31-Jul-07	45° 33.21'	-82° 08.77'	GL32	21.00	19.2

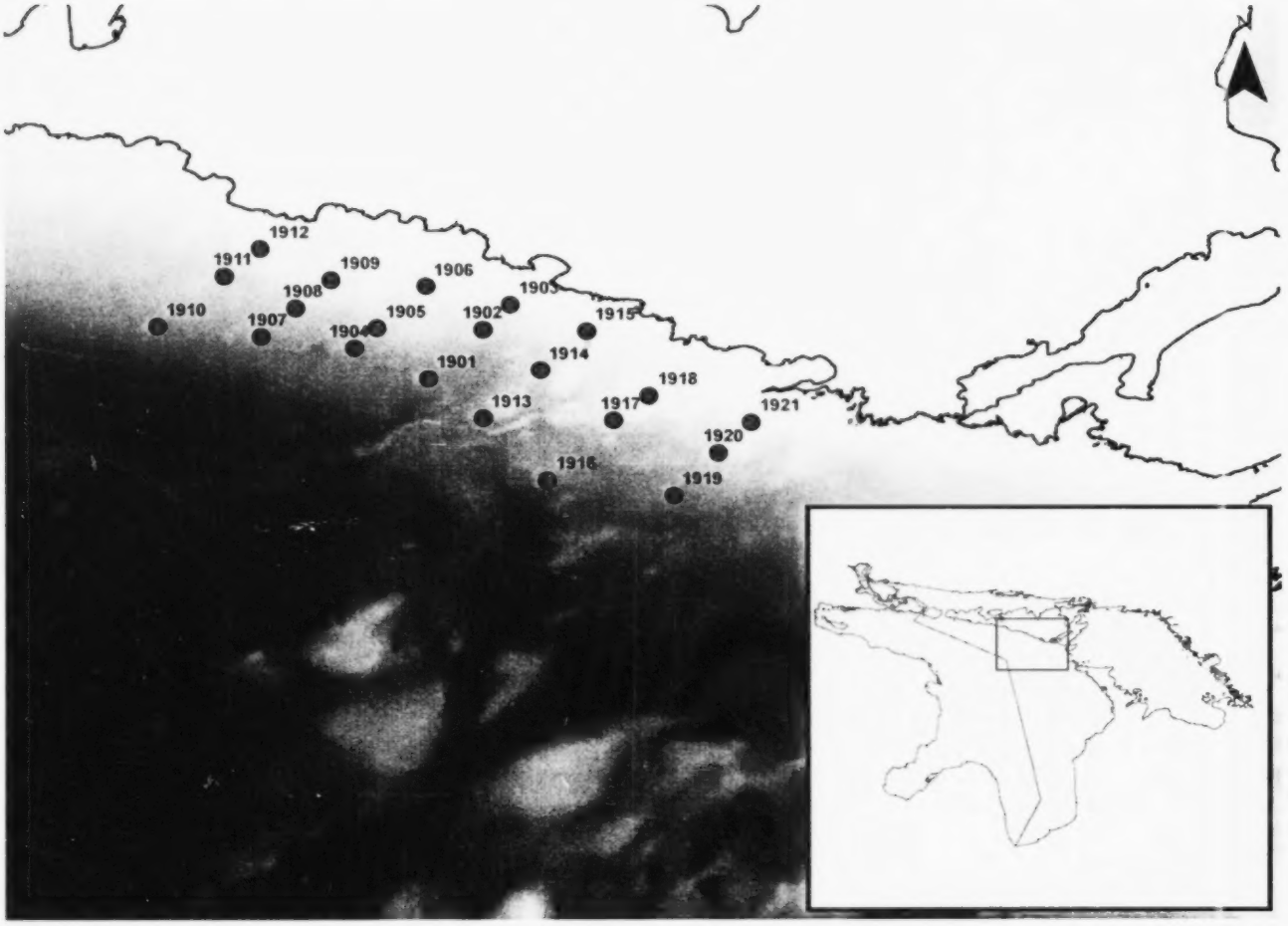

Figure 30. Offshore index sampling locations in the northern main basin near Providence Bay during 2007 (project code LHA_IA07_019). No specific species was targeted.

Table 14. Count of the number of fish by species caught in each mesh size of the gill nets set in the northern main basin during the 2007 offshore index program. Catch per unit effort (CPUE) is the mean number of fish caught per net each night.

	Mesh Size (mm)										
Species	**032**	**038**	**051**	**064**	**076**	**089**	**102**	**114**	**127**	**Total**	**CPUE**
Alewife	2									2	1.00
Burbot		1	3	1	3	1	1			10	1.67
Chub	2									2	2.00
Lake Chub	7	4								11	5.50
Lake Herring				3		1				4	1.00
Lake Trout		1	1	5	4	5	5	6	6	33	2.36
Lake Whitefish					1	5	11	8	5	30	2.50
Longnose Sucker		2	14	20	45	15	11	2	1	110	18.33
Round Whitefish		3	6	4	7	1				21	4.20
White Sucker						1				1	1.00
Total	11	11	24	33	60	29	28	16	12	224	

Species	Mesh Size (mm) 032	038	051	064	076	089	102	114	127	Total	CPUE

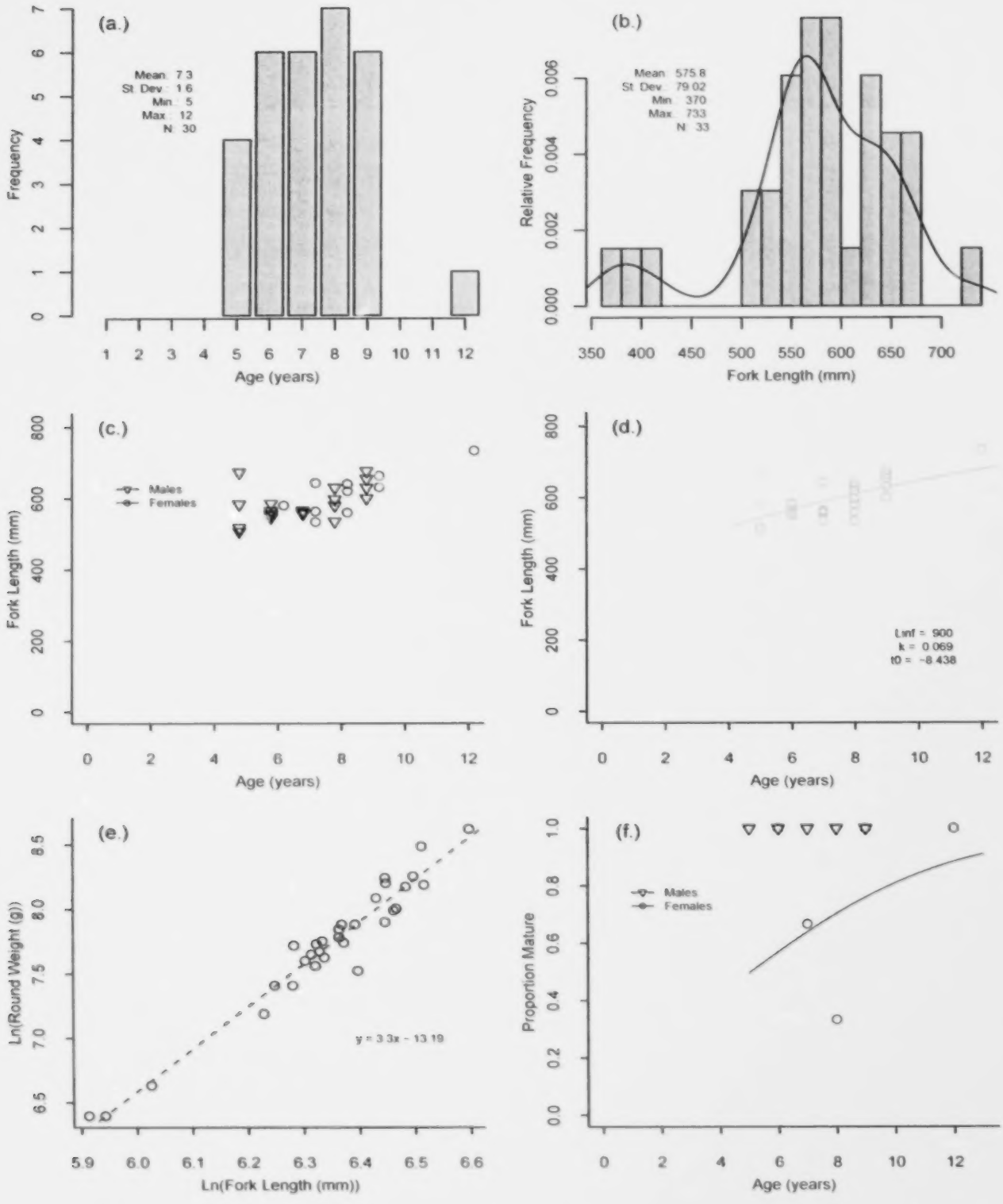

Figure 31. Lake trout fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the 2007 Providence Bay project (LHA_IA07_019).

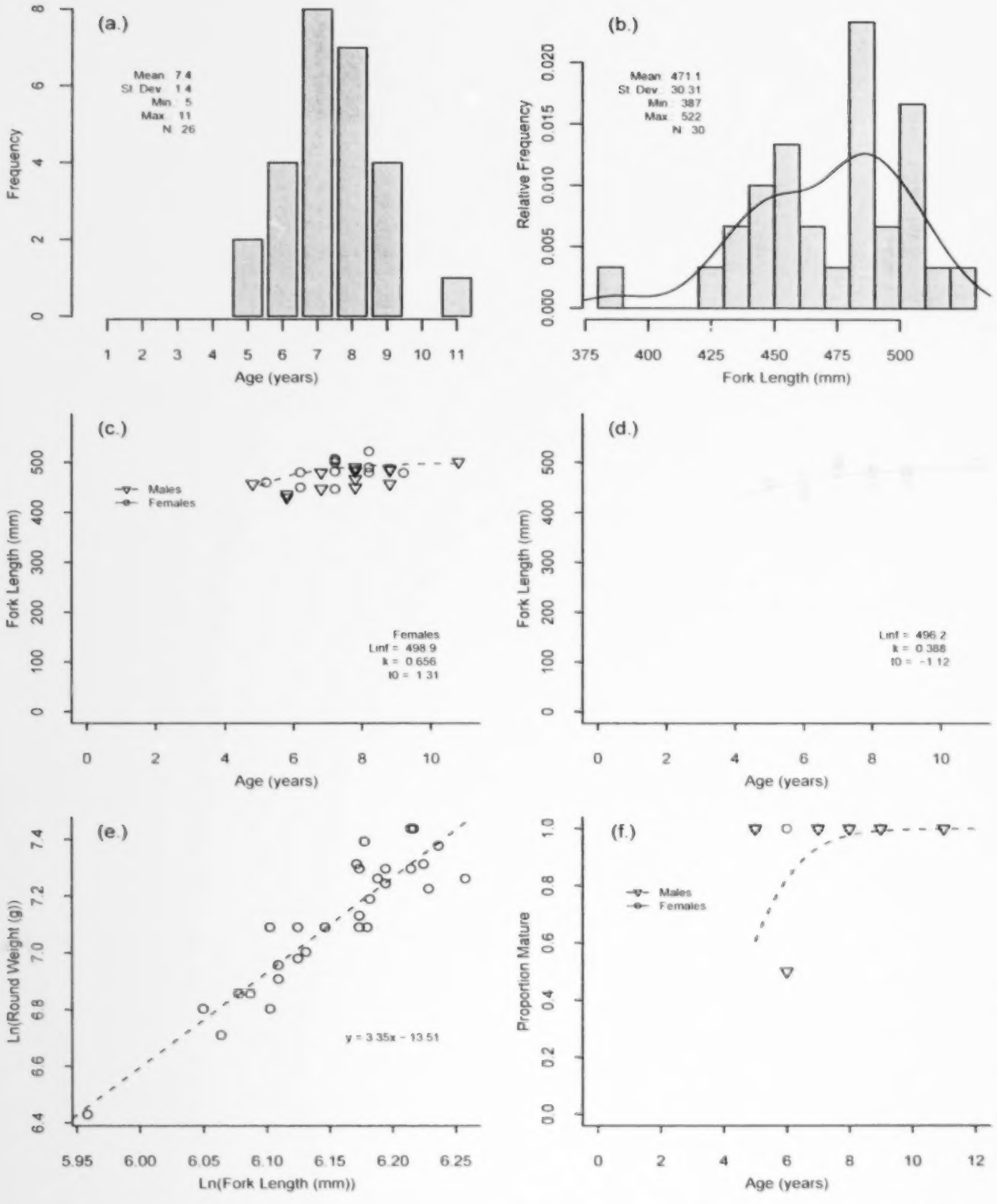

Figure 32. Lake whitefish fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the 2007 Providence Bay project (LHA_IA07_019).

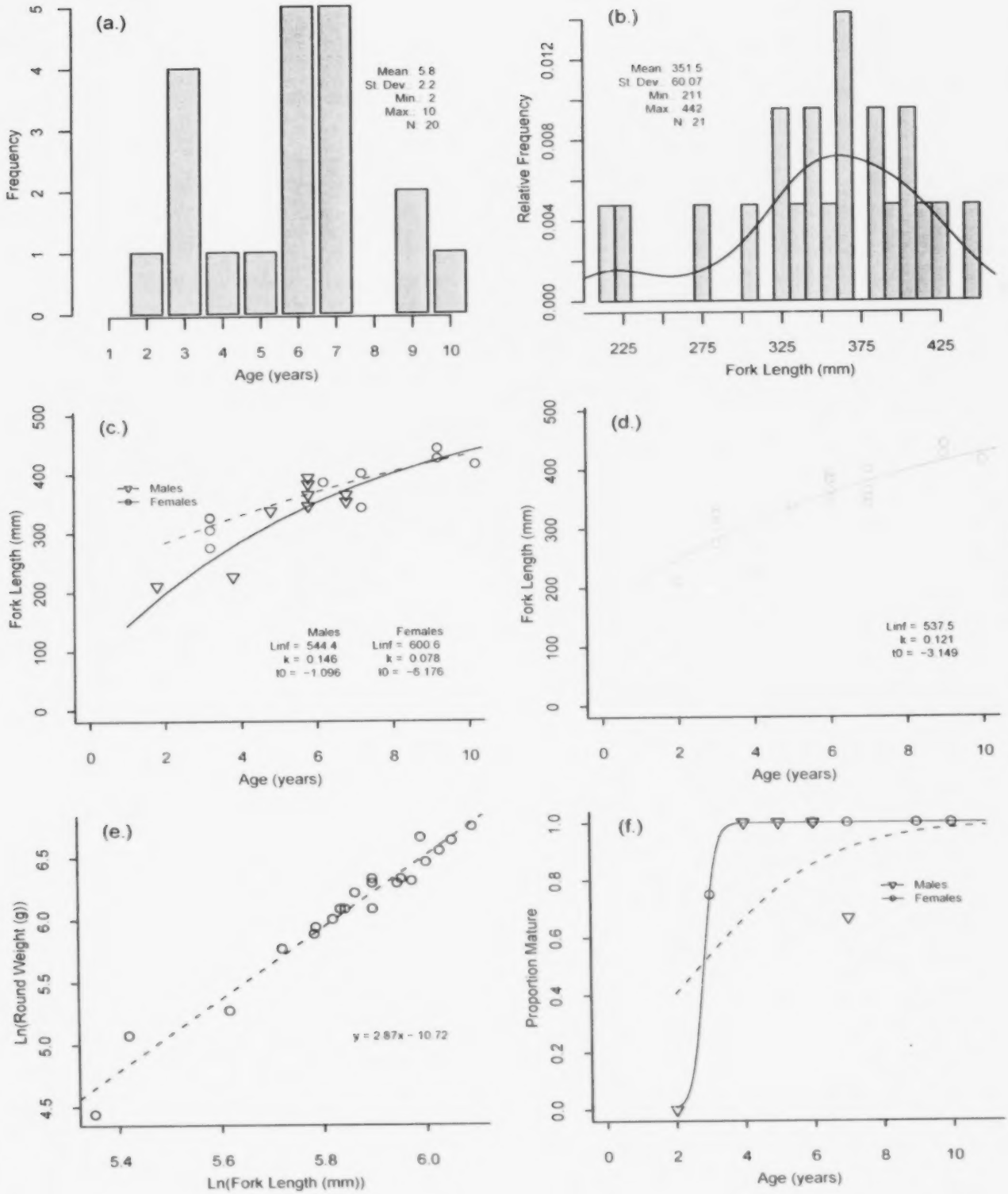

Figure 33. Round whitefish fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the 2007 Providence Bay project (LHA_IA07_019).

Douglas Point **[LHA_IA07_020]**

This first-time project was conducted with the assistance of the consultants at Bruce Power near the nuclear power plant close to Tiverton, central Lake Huron. The project ran between July 03 and July 14 (Table 15). The depth of the nets ranged between 12.2 m and 79.0 m. All 12 net sets were approximately 24 hours in duration. No specific species was targeted because this was a first-time project. The position of each net is shown in Figure 34.

Nine fish species were caught during this project (Table 16). The most common species were lake trout (78.0 % of the catch), lake whitefish (12.1 %), and longnose sucker (3.0 %). Plots of the biological attributes of the lake trout (Figure 35) captured during this project were constructed.

Average CPUE for this project was 11.0 fish/night. Lake trout had the highest mean CPUE (9.4), followed by lake whitefish (2.3). All of the remaining species had a mean CPUE of approximately 1.0. Although lake trout were caught in all mesh, the highest catches occurred in mesh sizes larger than 64 mm.

Table 15. Set information for the fishing gear deployed near Douglas Point (in the central main basin) during the 2007 offshore index program. Sample numbers 31, 34, and 37 were performed by the consultants at Bruce Power.

Sample Number	Set Date	Latitude	Longitude	Gear Code	Effort Duration (hrs)	Average Depth (m)
31	07-Jul-03	44° 75.80'	-81° 36.05'	GL32	19.00	14.3
34	07-Jul-04	44° 75.79'	-81° 36.65'	GL32	21.75	12.2
37	07-Jul-17	44° 75.80'	-81° 36.05'	GL32	21.25	14.4
2001	29-Jun-07	44° 18.93'	-81° 41.86'	GL32	23.71	79.0
2002	29-Jun-07	44° 20.44'	-81° 40.14'	GL32	22.70	68.3
2003	29-Jun-07	44° 22.86'	-81° 38.79'	GL32	21.50	60.3
2004	30-Jun-07	44° 18.73'	-81° 38.61'	GL32	22.11	44.2
2005	30-Jun-07	44° 20.91'	-81° 38.30'	GL32	21.08	39.4
2006	30-Jun-07	44° 22.66'	-81° 37.47'	GL32	20.06	38.3
2007	13-Jul-07	44° 19.08'	-81° 40.88'	GL32	20.45	71.3
2008	13-Jul-07	44° 20.93'	-81° 40.13'	GL32	19.38	67.1
2009	13-Jul-07	44° 22.72'	-81° 38.65'	GL32	18.36	63.1

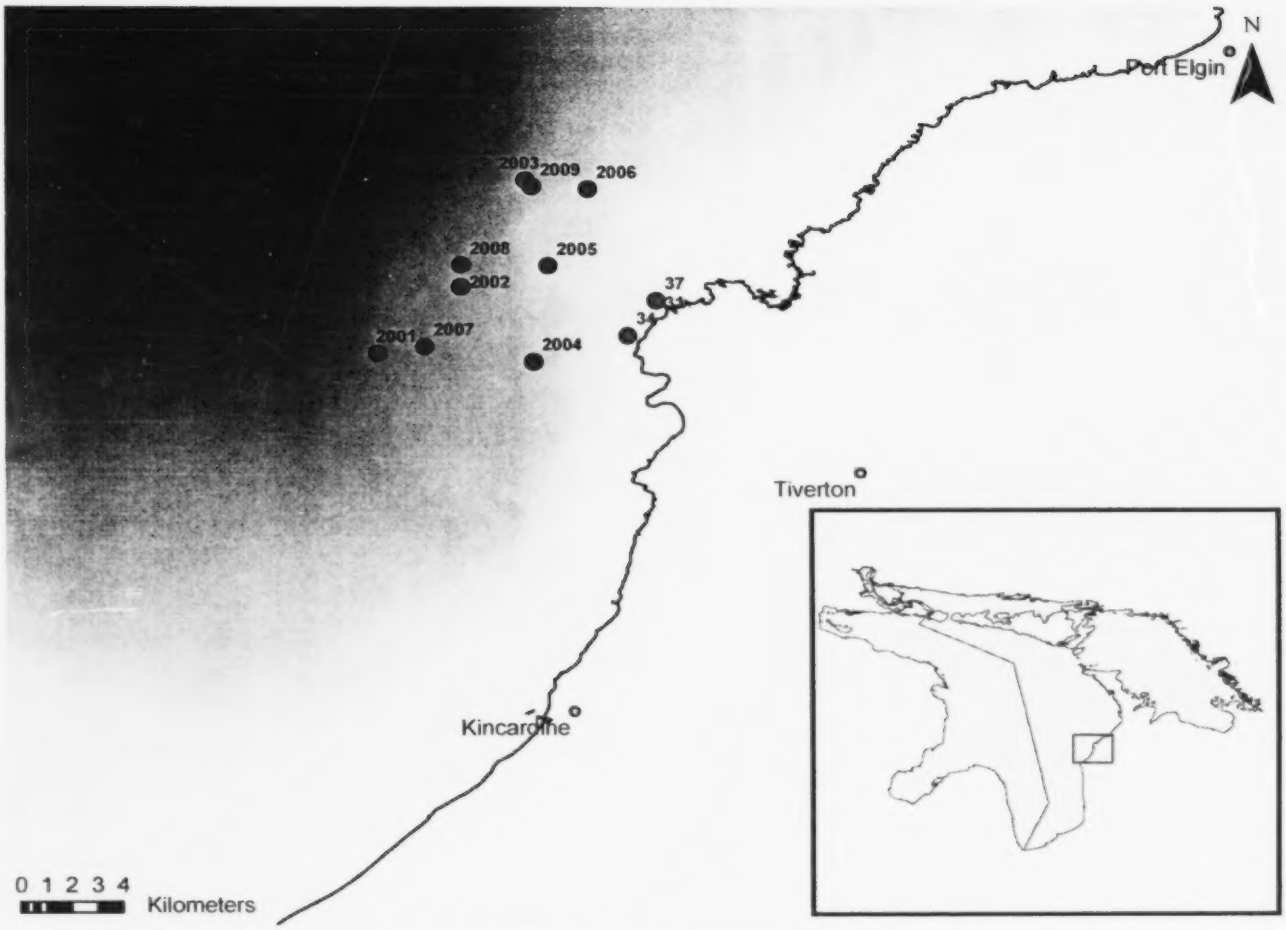

Figure 34. Offshore index sampling locations in the central main basin near Douglas Point during 2007 (project code LHA_IA07_020). No specific species was targeted.

Table 16. Count of the number of fish by species caught in each mesh size of the gill nets set near Douglas Point (in the central main basin) during the 2007 offshore index program. Catch per unit effort (CPUE) is the mean number of fish caught per net each night.

	Mesh Size (mm)										
Species	**032**	**038**	**051**	**064**	**076**	**089**	**102**	**114**	**127**	**Total**	**CPUE**
Burbot					1	1		1		3	1.00
Chub					2					2	1.00
Lake Chub	1									1	1.00
Lake Trout	2	1	8	9	22	15	20	14	12	103	9.36
Lake Whitefish						1	5	10		16	2.29
Longnose Sucker		1		1			1	1		4	1.00
Rainbow Smelt								1		1	1.00
Round Whitefish					1					1	1.00
Walleye						1				1	1.00
Total	3	2	8	10	26	18	26	27	12	132	

Figure 34. Offshore index sampling locations in the central main basin near Douglas Point during 2007 (project code CHA_IA07_020). No specific species was targeted.

Table 16. Count of the number of fish by species caught in each mesh size of the gill nets set near Douglas Point in the central main basin during the 2007 offshore index program. Catch per unit effort (CPUE) is the mean number of fish caught per net each night.

	Mesh Size (mm)										
Species	032	038	051	064	076	089	102	114	127	Total	CPUE
Burbot					1					1	1.00
Chub					2					2	1.00
Lake Chub	1									1	1.00
Lake Trout	2	1	8	9	22	15	20	14	12	103	8.58
Lake Whitefish						1	5	10	2	18	2.79
Longnose Sucker		1		1			1	1		4	1.00
Rainbow Smelt								1		1	1.00
Round Whitefish					1					1	1.00
Walleye						1				1	1.00
Total	3	2	8	10	26	17	26	26	14	132	

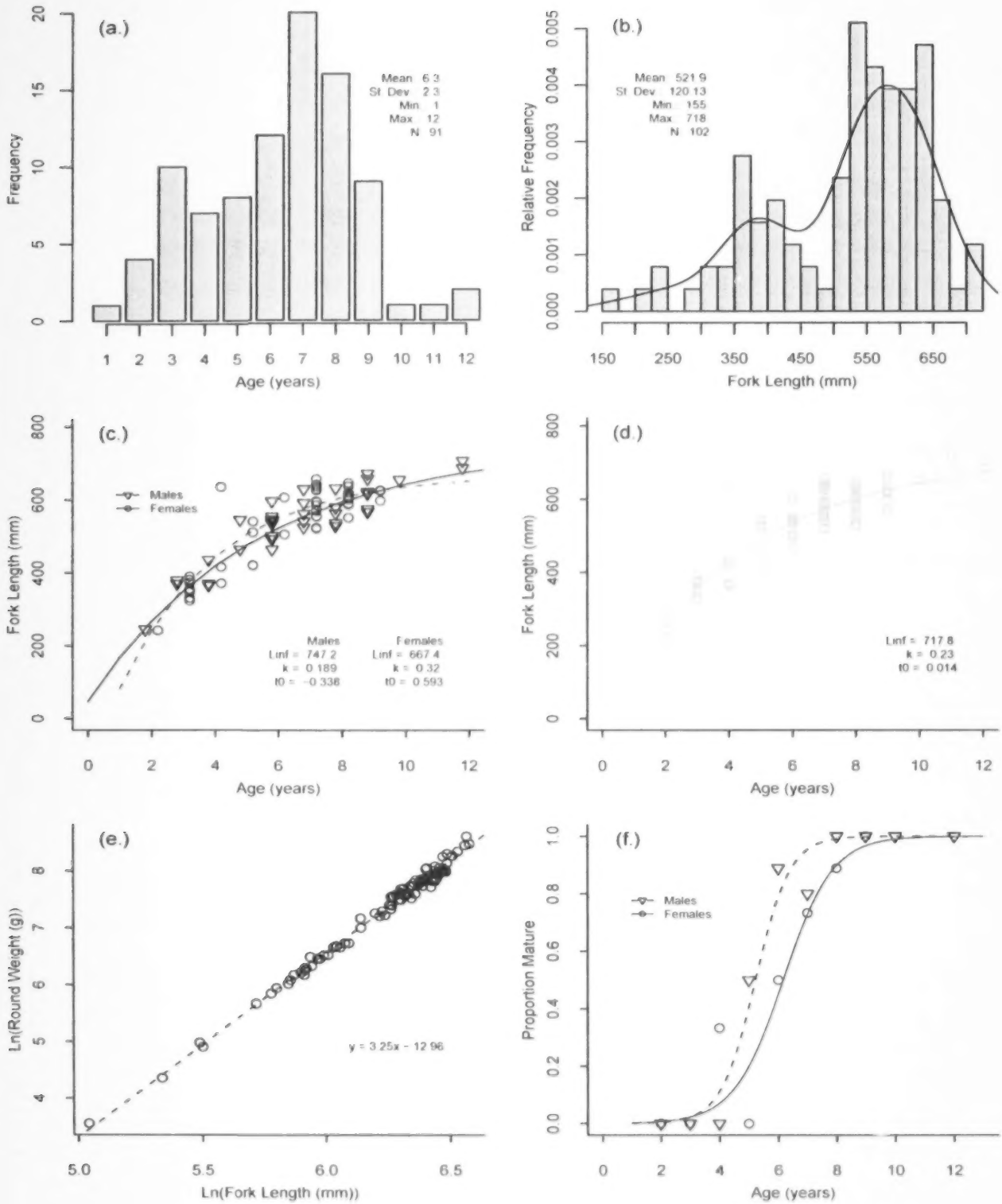

Figure 35. Lake trout fork length distribution (a), age distribution (b), fork length-at-age (by sex (c) and all fish combined (d)), weight-at length (e), and maturity-at-age (f) from the 2007 Douglas Point project (LHA_IA07_020).

Pre-Recruit Indices

Lake Whitefish

In general, the strength of the recent year classes of lake whitefish have been weak (Table 17). The strong 2003 and 2004 year classes found in the main basin have declined faster than average since they were first detected. The strength of these year classes are now well below average in central Lake Huron. However, their strength remains above average in southern Lake Huron. Subsequent year classes in the main basin are below the long-term average, suggesting that year classes after 2004 are not as strong as the previous two year classes. In Georgian Bay there have been five consecutive year classes with very low index values. Although the 1998 to 2001 year classes were strong, all subsequent year classes have been very weak.

Deepwater Chub

The strength of the year classes of deepwater chub is variable in the main basin (Table 17). The strength of the 2003 and 2004 year classes in southern Lake Huron are very high. However, year class strength could not be calculated in subsequent years due to low catch. In central Lake Huron, catches continue to be well below the long-term average. Catch was also too low in this region to prevent the calculation of accurate year class strengths.

Yellow Perch

The 2003 year class continues to be strong in the southern main basin (Table 17). However, subsequent year classes are weaker than the long term average. The 2006 year class is the weakest yet. In central Lake Huron the once-strong 2003 year class appears to be absent. An equally strong 2006 year class has arisen to take its place. In the North Channel the 2005 year class appears to be exceptionally strong. The 2003 year class is also stronger than average. The 2006 year class is considerably weaker; the pre-recruit index is less than 3.

Table 17. Pre-recruit indices for lake whitefish, deepwater chub, and yellow perch from select Quota Management Areas (QMAs) in Lake Huron. Indices for each QMA are calculated using data from their respective projects; 4-4 from the central main basin, 4-5 from the southern main basin, 5-8 from southern Georgian Bay, and 6-1 from the North Channel.

		Lake Whitefish			Deepwater Chub		Yellow Perch		
	QMA	4-4	4-5	5-8	4-4	4-5	4-4	4-5	6-1
Year	Cut Off	10	10	1	20	20	1	20	1
Class	Ages	1-3	1-3	1-3	2-4	2-4	1-3	1-3	1-4
1988									
1989					13.22	23.78			
1990		23.76	16.67	24.24	20.24	14.70	11.54	17.92	14.03
1991		10.28	13.33	10.58	2.62	6.54	81.65	18.80	12.64
1992		6.88	2.45	6.16	0.48	1.10	1.31	0.66	0.57
1993		7.37	12.63	7.97	2.75	3.82	14.75	7.74	7.03
1994		5.10	6.61	1.33	1.97	7.73	1.27	24.03	4.90
1995		5.28	7.66	12.90	3.81	6.54	4.18	17.93	11.22
1996		8.30	5.20	6.40	6.33	5.15	0.14	2.23	7.92
1997		5.42	9.72	1.48	21.63	6.60	1.05	4.61	15.93
1998		20.30	18.09	14.63	28.60	15.03	29.50	41.40	26.01
1999		13.08	9.10	44.93	22.14	11.78	2.33	3.64	7.51
2000		7.59	4.99	17.46	21.40	5.64	3.07	1.13	6.03
2001		5.38	6.75	18.05	4.42	0.00	5.14	2.04	0.40
2002		2.52	4.39	2.79	3.73	6.19	3.26	5.87	10.30
2003		39.17	28.79	0.39	2.64	24.20	12.17	22.30	8.83
2004		6.82	12.64	0.05	1.40	41.96	4.02	2.96	3.43
2005		3.02	5.97	0.51	0.00	0.00	1.19	1.81	41.02
2006		0.00	4.61	0.00			26.20	0.97	2.39
Mean		10.02	9.98	9.99	9.26	10.63	11.93	10.35	10.60

Discussion

Fewer fish species and less individuals were caught this year compared to last year, despite an increase in effort from 152 nets set during 2006 to 159 nets set during 2007. The number of species captured this year decreased by three to 24, a value still within the typical range encountered over the offshore index program's history. However, the total number of individuals that were captured has dropped by 27.9 %. The species captured most frequently remained yellow perch and lake whitefish. Longnose sucker has displaced white sucker as the other most commonly caught species. The sporadic nature of the sampling which took place in central Lake Huron during the fall should be taken into account when interpreting these results.

Some fish species had interesting changes in CPUE or distribution. Last year low CPUE of lake herring was observed during all projects. This year no lake herring were caught in the North Channel but high CPUE occurred in the main basin. For the second year in a row the CPUE of walleye in southern Lake Huron was very high; near the record CPUE encountered during the 2006 offshore index program. The invasive round goby was caught during all projects except for those that took place in northern Lake Huron and near Douglas Point. The CPUE of goby from southern Georgian Bay and southern Lake Huron were similar to the CPUE from last year. CPUE increased in the North Channel and in central Lake Huron during the fall. Last year no goby were caught during the fall in central Lake Huron.

Lake Whitefish Trends

In southern Georgian Bay the CPUE of lake whitefish increased after two years of decline. The CPUE in 2007 was the second lowest recorded over the past 20 years. The lowest CPUE occurred in 2006. The increase in CPUE is due to unusually high catches of the weak 2002 year class. The absence of strong year classes after 2001 suggests that the lake whitefish population in southern Georgian Bay may be undergoing major changes. These changes are likely associated with the decline of *Diaporea sp.* in southern Georgian Bay, an important food source for this species. The decline of *Diaporea sp.* in other parts of the Great Lakes has resulted in substantial changes to the distribution, growth, condition, and maturity of lake whitefish in those areas (Nalepa *et al.* 2005; Hoyle 2005). A similar change in the population characteristics of lake whitefish may be occurring in southern Georgian Bay.

The CPUE of lake whitefish in central Lake Huron (Southampton) has remained relatively stable for the past five years. The catch in this region was dominated by fish older than age five, as was

the catch near Douglas Point. The large number of fish younger than age five encountered last year near Southampton did not appear again in 2007.

The CPUE of lake whitefish in southern Lake Huron has remained stable since 2004. Much of this is attributed to high numbers of age three and four fish, representing strong 2003 and 2004 year classes. Unlike the central main basin, older fish were much less prominent in this location. Fish younger than the 2003 age class appear to be growing more slowly than their older counterparts. This trend was also observed during the 2006 offshore index program and may be due to changes in the Lake Huron food web. The most dramatic example of this can be seen in the southern main basin during the spring of this year and was seen in the central main basin during the fall of last year.

Lake Trout Trends

The CPUE of lake trout has remained stable in southern Lake Huron and doubled from 2006 in central Lake Huron. Prior to this, the CPUE of lake trout in central Lake Huron had been stable since 2004. The mean age of lake trout sampled in these locations has steadily increased from 4.5 in 2000 to 6.6 in 2007. Lake trout as old as 14 years of age were observed in the main basin.

Unlike the stable or increasing CPUE observed in the main basin, the CPUE of lake trout in southern Georgian Bay has been dropping steadily. This year CPUE was the lowest ever recorded, the fifth consecutive year which had a CPUE value lower than the previous year. This is consistent with a declining trend that started in 1993. Over this period CPUE has dropped from 38.1 in 1993 to 0.5 in 2007. The decline in CPUE is due to a reduced abundance of all ages, especially the 2001 year class. This was the last strong year class observed. Subsequent year classes were very weak in this area despite the annual stocking of lake trout that was performed during this period.

Eighty unclipped lake trout were observed during the offshore index program this year, most of which were from central Lake Huron. Unclipped lake trout composed 26.2 % of all lake trout captured at this location. This is the highest percentage of unclipped lake trout caught during a single year in this location. Although the percentage of unclipped lake trout have been increasing since the early 1990s, the increase has been more rapid during recent years. The new project near Douglas Point also produced a high percentage of unclipped lake trout (26.2 % of the lake trout caught at this location), the smallest of which were captured at a depth greater than 60 m. Unclipped lake trout were captured at all locations except those in the North Channel, where no lake trout were caught at all.

Yellow Perch Trends

The CPUE of yellow perch in central Lake Huron remained lower than historical values, even though the number of yellow perch caught during this project has been sporadic over the last 15 years. This year only one yellow perch was caught during the spring. CPUE in the fall project increased from zero last year to 10.3 this year. The strength of the 2003 year class in the central main basin has declined rapidly. At age one the average CPUE of the 2003 year class was almost three times the long term average. This year the 2003 year class was absent in 2007.

In southern Lake Huron the CPUE of yellow perch was comparable to those observed over the last six years. The catch was largely comprised of age four fish, the 2003 year class. Perch from the 2004 and 2005 year classes were also caught with high frequency during the fall. Although the 2003 year class has a high CPUE, its size appears to be much smaller than the last large yellow perch year class, the 1998 year class. This earlier year class entered into the fishery with other strong year classes that buffered it against direct exploitation. The strong 2004 and 2005 year classes observed in the fall may also be buffered by the abundant 2003 year class. These two later year classes may remain strong in southern Lake Huron because of this buffering effect.

In the North Channel the catch of yellow perch is up for the fifth consecutive year. The 2005 year class remains very strong in this area; it dominated the catch this year. The once-strong 2003 year class has declined rapidly over the past year. Similar to southern Lake Huron, few fish older than five years of age were observed in the North Channel. The absence of older fish and the high CPUE of the 2005 year class have reduced the mean age to well below the long term average in southern Lake Huron and the North Channel.

Deepwater Chub Trends

Deepwater chub in southern Georgian Bay and central Lake Huron continue to be present in very low numbers. Although more chub were caught this year in southern Georgian Bay, the CPUE of chub remained low due to their absence in nets targeting them specifically. In central Lake Huron chub CPUE continued to decline. Too few chub were caught in central Lake Huron to construct precise estimates of age distribution.

In southern Lake Huron the CPUE of deepwater chub has decreased after two years of higher values. Catches of deepwater chub in this location have been much more sporadic than in either central Lake Huron or southern Georgian Bay. Fish older than six years are absent and the catch is primarily composed of one- to three-year-old fish. The mean age of deepwater chub in this

location remains well below the long-term average (2.6 this year compared to 5.8 between 1993 and 2000). Fish large enough to be captured in mesh larger than 51 mm remain rare.

Summary

All of the projects planned for 2007 offshore index program were completed successfully. The new project run near Douglas Point ran smoothly and produced a large number of lake trout. Slime impeded the effectiveness of the gear in southern Georgian Bay and at the new location near Providence Bay.

In general, the species diversity observed from the 2007 offshore index program was lower than the species diversity observed from last year's program. However, the species diversity observed from many projects increased due to the re-appearance of salmonids, walleye, and yellow perch. These species were caught during both years but they were caught during more projects this year. Unfortunately, the CPUE of round goby increased in central Lake Huron during the fall and in the North Channel.

The 2003 year class of lake whitefish, walleye, and in some locations, yellow perch, remains strong. However, the general abundance of all fish was relatively low. For the second year in a row slime was present in sufficient quantity to reduce the effectiveness of some of the nets set in southern Georgian Bay to such an extent that no fish were caught.

The number and proportion of unclipped lake trout continues to rise in the main basin projects, especially in central Lake Huron. Of the 141 lake trout that were sampled from central Lake Huron, 26.2 % were unclipped and thus potentially wild individuals.

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